



**CITY OF DULUTH, MINNESOTA  
PUBLIC WORKS & UTILITIES DEPARTMENT  
ENGINEERING DIVISION**

# Engineering Guidelines

for  
Professional Engineering Services  
and  
Developments

Updated September 14, 2010

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## I. INTRODUCTION

Welcome to the City of Duluth's Engineering Division!

The Engineering Division (Engineering) is part of the Public Works and Utilities Department in the City of Duluth. Engineering is responsible for overseeing design and construction of public projects located in and affecting the public right-of-way, including surface transportation, bridges, driveway and alley access, traffic signals, parking, and utility infrastructure.

Engineering establishes and ensures that design standards and construction specifications are observed. Engineering has a responsibility to the public at large to create and maintain a consistent and reliable utility and transportation system. This system is planned, designed, and constructed according to the latest design standards and Engineering ensures the infrastructure is constructed to the highest and most current standards.

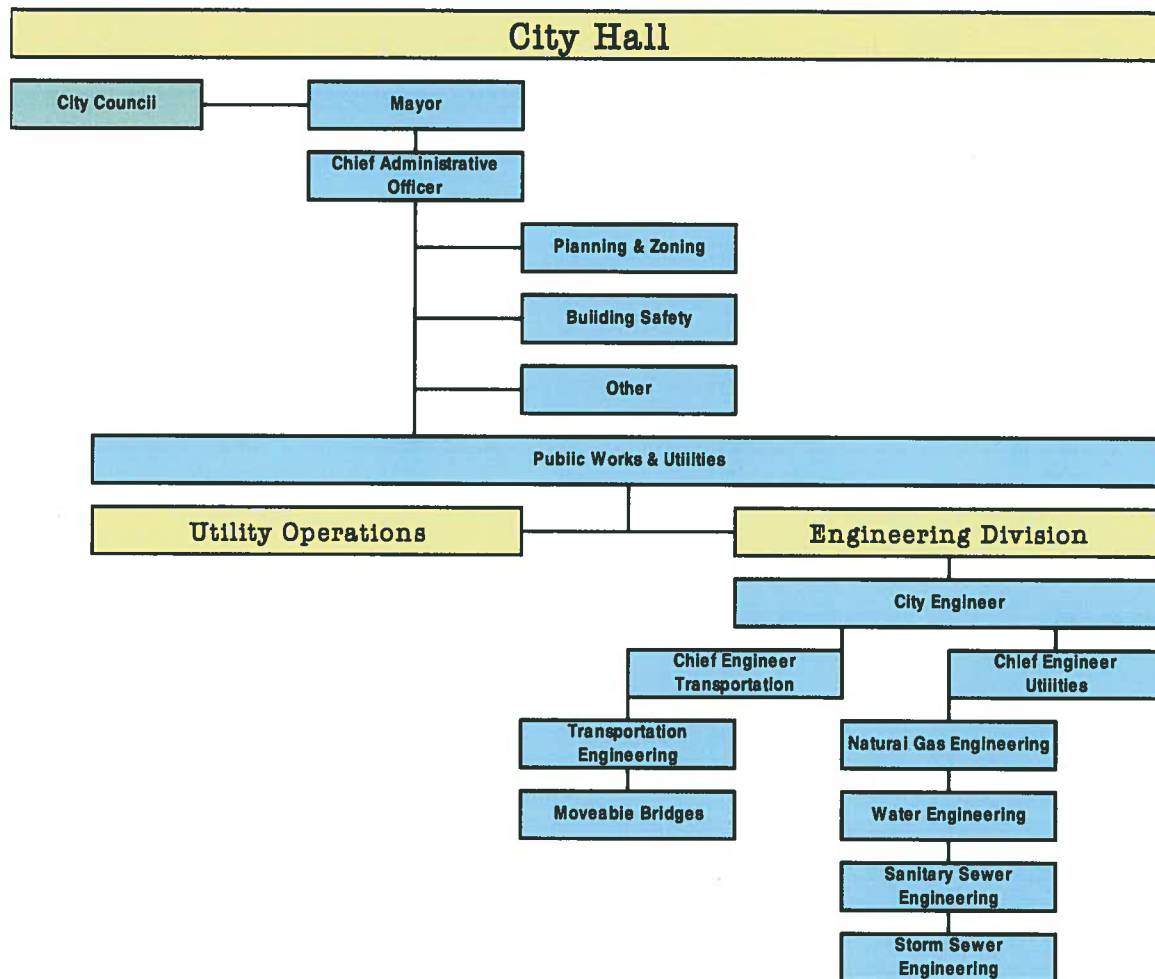
Additionally, Engineering issues a variety of permits that affect the public infrastructure such as, excavation in city right-of-way, driveway aprons, street and sidewalk obstruction, over-sized loads, accessible parking areas, new culverts, and sewer, water and gas main extensions and connections. The processes and procedures for permits can be found in the *Engineering Permits: A Handbook*. Permits related to work performed on private property are administered by the Building Safety Division.

In order to standardize engineering requirements for developers and engineers performing work within the City of Duluth, The *Engineering Guidelines for Professional Engineering Services and Developments* was developed by the Engineering Division to assist and convey direction to developers, engineering professionals, project managers, contractors, and residents when their projects include construction or connection to public infrastructure facilities within the City of Duluth.

These *Guidelines* as well as the city's "Standard Construction Specifications" and "Engineering Permits Handbook," outline the standards required when developing and constructing a project in the City of Duluth. They should be incorporated into the preparation of plans and specifications for sanitary sewer, storm sewer and water quality improvements, water main, natural gas, trails, and street construction within the City of Duluth. Compliance with these documents will help provide quality projects and assure uniform performance standards for the citizens of Duluth, Minnesota, and can save considerable time during the development process.

The *Guidelines* serve as a general reference for engineering requirements in the design, plan, and specification preparation in an effort to facilitate consistent plan preparation and construction of public works and to improve the quality of plan submittal and subsequent review and approval time. The *Guidelines* also strives to clarify where "Engineering" fits in as a part of the greater project and land development process.

The organizational chart below has been greatly simplified to illustrate how Engineering, led by the City Engineer, fits within Duluth's city government.



The *Engineering Guidelines for Professional Engineering Services and Developments* is a “living” document that will be updated and revised as necessary to facilitate the development of projects within the City of Duluth. With this document, we hope you will better understand the requirements and more easily navigate Engineering.

City staff is available to answer your questions or concerns as the project progresses through the process. Engineering is located on the second floor of the Duluth's City Hall. For general questions relating to this document, the Engineering Division, or any permits issued from this office, you may contact the front counter at (218) 730- 5200.

If the engineering staff cannot answer your questions, specific questions relating to transportation and utilities may be directed to:

Eric Shaffer, PE  
Chief Engineer of Utilities  
Room 211, 411 West First Street  
Duluth, MN 55802  
Phone: (218) 730-5072  
[eshaffer@duluthmn.gov](mailto:eshaffer@duluthmn.gov)

Cari Pedersen, PE  
Chief Engineer of Transportation  
Room 211, 411 West First Street  
Duluth, MN 55802  
Phone: (218) 730-5091  
[cpedersen@duluthmn.gov](mailto:cpedersen@duluthmn.gov)

Questions may also be forwarded to the City Engineer:

Cindy Voigt, PE  
City Engineer  
Room 211, 411 West First Street  
Duluth, MN 55802  
Phone: (218) 730-5071  
[cvoigt@duluthmn.gov](mailto:cvoigt@duluthmn.gov)

You may also visit our city website, 24 hours per day for a copy of this document and other information regarding city code and ordinances, zoning, planning, and much more at [www.duluthmn.gov](http://www.duluthmn.gov). We look forward to working with you to ensure your plan and project development experience in Duluth is a pleasant one.

## **II. DEVELOPMENT PROCEDURES AND REQUIREMENTS**

Most development projects require approvals from the Planning Department or Planning Commission prior to final design of the project. Therefore, it is recommended that developers meet with the planning department prior to commencing work on the engineering aspects of the development.

Once the initial contact with planning has occurred, the developer should meet with Engineering to discuss the proposed development and the overall scope of the project. At this time, a project manager from Engineering will be assigned to the project to provide engineering assistance to facilitate the process and to assure compliance with the engineering standards for the citizens of Duluth.

The developer is responsible to hire a professional engineer registered in the state of Minnesota to perform the required professional services, which may include, but not limited to topographic survey, grading, drainage, street, utility plans, and any necessary permit submittals.

### **A. Memorandum of Understanding (MOU)**

A Memorandum of Understanding will be required for most projects developed within the City of Duluth, and in particular where the intention of the developer is to turn over ownership, maintenance, and operation of the public improvements to the city, and whenever public improvements or other conditions of approval are necessary. The MOU generally documents the following:

- Specific understandings of both parties relative to the construction of public and private improvements associated with the project.
- Specific project guidance and requirements.
- Which elements of the project will be private and which will be public.
- Which elements of the project will be paid for by the developer.
- Amount of deposit to be held by the city until project certification and acceptance.

No construction may begin on a project until the MOU is signed by both parties. The template of a typical MOU can be found in Appendix A.

## **B. Paying for Public Improvements**

Two options are available to allow a developer to have local improvements made and paid for in the City of Duluth:

“Public Improvements Made Privately” where the developer is the responsible party to design, construct, and pay for the desired public improvement, and

“Special Assessments” where the developer chooses to construct the desired public improvements that are paid for either in part or in whole through an assessment against the benefiting property owner(s).

### **1. Public Improvements Made Privately**

The following procedure applies when the developer chooses to construct a public improvement that will be designed, constructed, and paid for privately. This process, as a general rule, is less costly and quicker to implement than the special assessment process.

Prior to construction:

- a. The consulting engineer determines what the current standards are for the type of improvements contemplated.
- b. The consulting engineer in consultation with the developer prepares preliminary plans for the improvements in accordance with the applicable standards.
- c. The consulting engineer reviews preliminary plans with Engineering and other required city offices.
- d. The Consulting Engineer reviews the Storm water Pre-submittal Requirement Worksheet with Engineering.
- e. Following approval by the city, the consulting engineer submits plans to other permitting agencies (WLSSD, MPCA, etc.), as required.
- f. The developer secures all permits required from other permitting agencies and provides copies of required permits to the City Engineer.
- g. The city prepares a MOU between the city and the developer if any of the improvements are to be connected to City streets or utilities or the City will be taking over control of or maintenance of any of the improvements. The MOU will require the developer to deposit funds for city expenses, including project

reviews and approval by Engineering, as required. The consulting engineer shall furnish exhibits for the MOU as required.

- h. The consulting engineer must furnish a letter to Engineering stating they have been hired for construction engineering, inspection, and record drawings.
- i. All necessary easements must be legally described in recordable form approved by the City Attorney. Developer must establish to the satisfaction of the City Attorney that they will be able to legally dedicate the easements, without cost and absolutely to the City. Final easements may be signed following construction; however the city will not accept the project until easements are recorded. All costs to obtain easements or right-of-way, draft the documents and recording fees are the responsibility of the developer. All easements are granted to the city.
- j. Any agreement for reimbursing connection fees must be approved by the Special Assessment Board.
- k. The developer must provide documentation if additional owners of adjacent property(ies) are participating in the project cost. This will assure that these property owners will not be charged fees in lieu of assessments in the future.
- l. The consulting engineer submits final plans and specifications to Engineering for review and approval. All plans and specifications shall be signed by a professional engineer registered in the state of Minnesota.
- m. The developer hires a contractor to construct improvements per approved plan.
- n. The contractor must have a performance bond and certificate of insurance approved by the city attorney on file in the purchasing office. The city shall be as additional insured on the insurance policy and dual obligee on bond.
- o. The developer and contractor both sign the *Application to Make Public Improvements Privately*. A copy of this is included in Appendix B.
- p. The developer hires a consulting engineer or agrees to reimburse the city to provide construction inspection, at the discretion of the City Engineer. City inspection costs shall be reimbursed by the developer including city audited overhead and direct expenses.
- q. The consulting engineer shall provide notification of project scope, timeline, and emergency contact information to appropriate residents and City Council members prior to the start of construction.
- r. Construction may begin.

#### During Construction:

- a. Inspection is required for all work to be publicly owned, including underground utilities, streets, sidewalks and restoration.
- b. Changes to approved plans must be approved by the City Engineer prior to construction.
- c. Coordinate water main bacteria and pressure testing with the city 48 hours (2 working days) prior to scheduled test.
- d. Coordinate sanitary sewer televising with the city at least one week in advance.
- e. Obtain and compile record drawing information and coordinate data and complete utility forms.

#### After Construction:

- a. The consulting engineer completes all post construction submittals (record drawings, etc.).
- b. Final easements are signed and recorded.
- c. Warranty, final inspections, and acceptance of the project by the City Engineer.
- d. Certification of acceptance of project submitted to City Council by City Engineer.
- e. The city assumes ownership of specified improvements and begins locating of city owned utilities in accordance with the requirements of the Gopher State One Call System and snow removal for new city streets.
- f. Individual service permits may be issued.

## 2. Special Assessments

When the developer chooses to construct public improvements that are paid for either in part or in whole through an assessment against the benefited property, the developer has several options along with certain responsibilities.

The developer will be required to submit a deposit for 20% of the estimated cost of designing and constructing the planned improvements before construction is started.

One of the first decisions the developer will need to make is whether to have the Engineering Division perform the engineering design and inspection services for the project, or to hire a consulting engineer to perform this work. In either case, the engineering costs would be eligible for inclusion in the final assessment roll, but are not considered part of the 20% deposit that is required of the developer.

If the property to be assessed is solely owned by a single party, the developer may opt to enter into an agreement approved by the city council to waive all rights to a public hearing and withdrawal of petition. This would allow the assessment process to proceed more quickly. If the developer doesn't own the requisite property and cannot secure the consent of all affected property owners, he or she will have to follow the assessment procedures set out in the City Charter.

If the developer chooses to hire a consulting engineer to perform the engineering services, such consultant shall prepare the cost estimates necessary for the council resolutions.

In addition, if the project involves other property owners, informational meetings with the residents will be required.

Additional information on special assessments can be found in the City of Duluth Special Assessment Board Policy Handbook.

### III. GENERAL ENGINEERING REQUIREMENTS

Listed below are the general requirements to ensure plan development, project construction, surveys, and record drawings are in accordance with the city's engineering standards, regulations, and policies. The requirements of this document shall be considered the minimum. Specific projects may have additional requirements that may be more stringent.

- a. The most recent version of the *City of Duluth Standard Construction Specifications* and any supplements, addenda, and special provisions shall apply to all work.
- b. The developer will be required to upgrade any existing infrastructure with insufficient capacity to serve the proposed development.
- c. Construction shall not begin on a project until all engineering requirements for public improvements have been satisfied.
- d. For all projects, WPA soil boring maps and sewer plats (on file in the Engineering Division) shall also be reviewed by the engineer to determine approximate rock profiles.
- e. All underground utilities to be publicly owned shall be installed in the existing or proposed public right-of-way when feasible. Where, due to topography, installation within the right-of-way is not possible, the city may accept underground utilities installed in a utility easement on a case by case basis.
- f. All utilities that will be privately owned and maintained shall not be installed within public right-of-way.
- g. Publicly owned utilities less than 15 feet deep installed outside the city right-of-way will require a minimum of a 20-foot wide permanent easement; utilities deeper than 15 feet shall have 30 foot wide easement. The utility must be centered within the easement, and the easement shall be dedicated to the city and recorded with St. Louis County.
- h. Public utilities not located within city right-of-way must be located in an easement where city maintenance crews have clear access to inspect and maintain the utility. All sanitary and storm sewer manholes must be accessible by city sewer cleaning equipment. This includes providing a driving surface if necessary to support this equipment.
- i. Where public utilities are installed on private property, the property owner shall be responsible for all future surface restoration required due to repair or maintenance of the utility by city crews.
- j. Infrastructure extensions not constructed and installed to city standards shall be corrected prior to city acceptance and prior to being placed into service. If defects are not corrected, the utility shall not be placed into service. Where, for any reason, the defective utility has been placed into service, the developer shall be responsible for ownership and maintenance of the utility until the defects are corrected.
- k. Installation of all utilities shall extend entirely across the frontage of the lots to be served, unless otherwise approved by the city's engineer. If the project is

completed in stages, then all utilities must be extended past the lot line of the last house served and beyond the pavement limits.

- l. Where a property to be developed is not currently served by water and sewer, the developer shall be responsible for all costs to extend the utilities to the property.
- m. All disturbed areas within an existing right of way shall be restored with sod to a condition equal to or better than the existing condition prior to construction.

#### **IV. TRANSPORTATION REQUIREMENTS**

The Engineering Division is responsible for all street and roadway related projects within the public right-of-way, including the inspection, construction, and replacement of streets, alleys, bridges, sidewalks, and traffic signals, as well as addressing traffic concerns.

The following general transportation requirements will be required for most projects developed within the City of Duluth:

- a. A traffic study may be required if Engineering determines there may be an adverse impact on traffic, mobility, and/or safety due to the proposed development.
- b. Soil borings shall be completed prior to the design of any street project. The borings shall be evaluated by a registered engineer and recommendations made in writing. Borings shall be located within the project area at intervals necessary to accurately assess the soil conditions within the project area. Boring information shall be included on the drawings. A copy of the boring information and geotechnical report signed by a licensed engineer shall be submitted to Engineering.
- c. Local Street Design Standards (see Section A, below)
- d. Street Extensions Standards for Limited Residential Development (see Section B, below)

##### **A. Local Street Design Standards**

The minimum standard cross-section for the construction or reconstruction of a local street shall conform to the Planning Commission's "Local Street Design Standards and Process for Variances," listed below:

Dimension Requirements – Local Streets			
	Street Width Curb-Face to Curb-Face	Boulevard Width	Sidewalk Width
New	28'	8' – 10'	5'
Reconstructed	24' – 28'	4' – 8'	5'
Historic Designation	per guidelines below		

1. Boulevards

Boulevards shall be provided on both sides of a street and required to be planted with trees with a minimum caliper of 2 ½" for all street improvement projects. Spacing should be a maximum of 40' on center. (A diversity of shade trees should be planted to avoid problems associated with disease killing all the trees within a neighborhood.)

2. Sidewalks

Sidewalks shall be provided on both sides of a street. A variance may be allowed for sidewalk on only one side of street if it will help to preserve existing mature trees or allow a wide enough boulevard for planting new trees.

3. Reconstructed Streets

Under certain circumstances and through granting of variances (as described below), reconstructed streets may be less than 24 feet, but in no case shall they be less than 20-feet wide. At least one of the following criteria must be met to grant such a variance:

- a. Where adjacent collector streets are aligned in a way that encourages traffic to short-cut through a neighborhood, narrower streets, along with other measures to discourage such short-cutting are justified; or
- b. The presence of alleys or other off-street parking opportunities which eliminate the occurrence of on-street parking by residents justifies narrower streets; or
- c. Low residential densities (wide single family lots) which eliminate the need for on-street parking may allow for narrower street than standard; or
- d. Mature trees within the right-of-way, which would otherwise be able to be retained, justifies narrower streets; or
- e. Where the character of the immediate neighborhood would otherwise be negatively affected (i.e., scale of street relative to adjacent buildings: grades requiring new retaining walls which would be out of character with the existing architecture; wide street distracting from important views of residences; loss of privacy screening; degradation of gardens; etc.) a narrower street is justified; or
- f. Where there would be insufficient space for snow storage because the wider street would result in more plowed snow to be stored and thus higher snow banks which would cause visibility problems.

4. Historic Designation

A 20-foot wide variance would be allowed on an existing 20-feet-or-less street if at least two of the following criteria are met:

- a. The street is located within a locally designated or a proposed designated historic or conservation district. (Survey in place or underway determining historic designation or significance.)
- b. If and only if the street has historically always been 20-feet-or-less in width.
- c. At least one locally designated historic landmark or national register home or property is located on the street.

- d. An historic street material or feature is present (which should be respected, i.e., trees, landscape features, granitoid, street lighting, signage, retaining walls, fencing, monuments, curbing, etc.). The “new” street material should reflect sensitivity to these materials.
- e. A ruling body which deals directly with Duluth’s heritage or Duluth’s historical structures and areas (such as the Heritage Preservation Commission) has determined that the historic character of the immediate neighborhood would be affected by widening the street to more than a 20-foot width.
- f. In situations in which, due to extreme topographical limitations, a street width variance would allow a lower cost or more reasonable alternative in the construction or reconstruction of the street.

## 5. Variance Procedure

The Planning Commission shall be the body that rules on variance requests to deviate from the above enumerated standards, i.e. street widths, boulevard widths and location, sidewalk widths and street trees except for issues involving designated historic sites or districts. Appeals to the planning commission decision are ruled on by the City Council. In locally designated or proposed designated historic sites and districts, the Historical Preservation Commission (HPC) is the certified local government unit that deals with historic preservation issues. The HPC shall have opportunity to review and make recommendations to Planning staff before the Planning Commission rules on the variance request. Any property owner adjacent to the street or any city department or division manager may request such variance.

### **B. Street Extensions Standards for Limited Residential Development**

The Street Extension Standards establish the requirements for extending an existing street for the purposes of accessing a proposed residential development. In many cases, the existing street does not meet the current Local Street Design Standards, or the Typical Section Standards, both addressed elsewhere in this document.

The Street Extension Standards provide a reasonable and consistent manner by which to address the required level of improvements to both an existing street that will serve as a connection to a proposed street extension, and the proposed street extension itself. It is recognized that certain situations may require a variance from these standards. Any variance requests shall be reviewed and acted upon by the Special Assessment Board following review and recommendations of the City Engineer.

In general, the costs to improve, reconstruct, or construct the existing street to the City of Duluth’s minimum standards shall be the responsibility of the developer. At the discretion of the City Engineer, the existing street may be included in the city’s formal Street Improvement Program (SIP) and constructed to SIP standards, with reconstruction costs to be shared between the city and adjacent property owners per SIP guidelines. In all cases, the extended street shall be constructed to City of Duluth

standards with costs to construct the extended street to be the responsibility of the developer.

The "Street Extensions Standards for Limited Residential Development Matrix & Standard Termini" is located in Appendix C. Note that in all cases, the requirements represented are minimums, and in no case shall the extended street be constructed to a standard less than the existing street. Further, it is the responsibility of the designer to incorporate the requirements of the most current fire code observed by the Duluth Fire Department.

In addition, it is recognized that under those categories where a street is not constructed, reconstructed, or improved to City of Duluth standards for an urban bituminous street, there may be a need for a recordable "disclaimer" agreement between the city and the developer so as to provide for the assessment of future street improvements against adjacent properties per city's code provisions regarding "Local Improvements" (Article VII, as amended by Ordinance 09-019-0).

### **C. Typical Section Standards**

Generally and in most situations, a typical new road section in the City of Duluth will be built to urban design standards. The other typical section used within the City of Duluth is the rural design section, allowed only within areas indicated as rural residential in the *City of Duluth Comprehensive Land Use Plan* (2006) and only when approved by the City Engineer.

The standard specification for each type of road section is outlined in the table below and the example CADD drawings of the typical sections can be found in Appendix D.

City of Duluth Standard (Minimum)	Urban Bituminous	Rural Bituminous
Geotextile Fabric	Type 5 (non-woven)	Type 5 (non-woven)
Select Granular Backfill (mod <7%)	12"	12"
Class 5 Aggregate Base	8-1/2"	8-1/2"
Width of Street	28'	28' with 2' gravel shoulders
Drainage	as per city engineer	as per city engineer
Surfacing Material	bituminous	bituminous
Depth of Surface Material	3-1/2"	3-1/2"
Width of Surfacing	28'	24'
Concrete Curb & Gutter (B624)	Yes	

### **D. Driveways and Alleys**

All driveways and alleys shall be installed in accordance with the City of Duluth Driveway Entrance Requirements contained in Appendix E, and as per the Policy on the Issuance of Driveway Permits for Private Improvements in Right-of-Way, found in Appendix F.

## **V. UTILITIES REQUIREMENTS**

The Engineering Division is responsible for ensuring all utility projects, including the design, inspection, installation, and replacement of gas, water, sanitary sewer, and storm water improvements comply with state and federal regulations.

### **A. Natural Gas**

All extensions to the City of Duluth natural gas distribution system and services shall be designed and constructed in accordance with the *City of Duluth Public Works and Utilities Department Gas Operation and Maintenance Manual*, along with the *City of Duluth Standard Construction Specifications*, including any supplements, addenda, and special provisions.

- a. Any project with a natural gas component shall be reviewed by Engineering.
- b. Natural gas mains in new developments shall not be installed until after curb and gutter for the street is placed.
- c. All new services require a service application to be submitted to the Engineering Division prior to October 15 for installation that year.
- d. Natural gas installers must be certified per the city standards.
- e. For installation of pipes on new building sites, the site must be prepared (graded within 2" of final elevation) for installation no later than November 1 of each construction year.
- f. After November 1, an approved trench must be excavated by the developer to enable installation of the line to occur prior to the following construction season. Trench details can be found in the most recent edition of the *City of Duluth Standard Construction Specifications*.

### **B. Water**

All water mains shall be installed in accordance with the Recommended Standards for Water Works by the Great Lakes Upper Mississippi River Board of State Public Health and Environmental Managers (Ten-State Standards) except as stated below or as listed in the *City of Duluth Standard Construction Specifications* and any supplements, addenda or special provisions.

- a. Minimum water main diameter shall be 8 inches unless approved otherwise by the city engineer.
- b. The city may require upsizing of proposed water mains for future projects.
- c. The city may require upsizing of existing mains, pressure reducing stations or booster stations to provide adequate flows to the proposed development area.
- d. In general, water main extensions shall be publicly owned. The developer may request a water main to be privately owned if the main and the services are not located within the city right-of-way and where it will not serve any future development. Privately owned mains also require permitting from the Building Safety Division.

- e. The city will determine, on a case-by-case basis, if water booster stations or water pressure reducing stations required for the project will be owned by the developer or the city. All booster stations or pressure reducing stations to be owned by the city shall be designed and constructed to city standards. In all cases, the developer shall pay for installation of telemetry equipment for remote monitoring of the equipment by the city. Privately owned booster stations also require permitting from the Building Safety Division and a Homeowners' Agreement.
- f. Inspection of high-density polyethylene (HDPE) pipe must be performed by an inspector qualified by the City of Duluth.
- g. Minimum fire flows for main extensions shall be in accordance with the City of Duluth Fire Department requirements.
- h. Water main valves shall be spaced from 300 to 400 feet apart or at the end of every city block or as specified by the City of Duluth Fire Department.
- i. Hydrant locations shall be spaced from 300 to 400 feet apart or at the end of every city block or as specified by the City of Duluth Fire Department. A hydrant shall be provided at the end of all dead end mains unless a blow off is approved by the City Engineer for mains smaller than 6 inches.
- j. Minimum cover on ductile iron water mains shall be 7'-0". Minimum cover on HDPE water mains, except dead ends, shall be 7'-6". Minimum cover on HDPE dead end water mains shall be 8'-0". Maximum cover of any main shall be 9'-0".
- k. Water main extensions of 100 feet or less for water mains 6 to 12-inches in diameter may be ductile iron or HDPE unless the area has a history of highly corrosive soils, then mains must be HDPE.
- l. Water main extensions longer than 100 feet for mains 6 to 12-inches in diameter shall be HDPE unless specified otherwise by the City Engineer.
- m. Water main extensions for 2, 3, and 4-inch pipe diameters shall be HDPE.
- n. Material for water mains 14-inch and larger shall be determined on a case by case basis.
- o. The use of electro-fusion couplings shall be minimized and the location of any electro-fusion couplings shall be documented on the record drawings.
- p. All existing valves and hydrants shall be operated only by city personnel.
- f. Coordinate water main bacteria and pressure testing with the city 48 hours (2 working days) prior to scheduled test. Contact Duane Burgstahler, Senior Engineering Technician, at 218-730-5082 or the Engineering Office at 218-730-5200. All pressure tests must be witnessed by the City. All bacteria samples will be collected and tested by the City.

### **C. Wastewater Collection System**

All sanitary sewers shall be installed in accordance with the Recommended Standards for Wastewater Facilities by the Great Lakes Upper Mississippi River Board of State Public Health and Environmental Managers (Ten-State Standards) except as stated below or as listed in the *City of Duluth Standard Construction Specifications* and any supplements, addenda or special provisions.

- a. All wastewater lift stations to be owned by the city shall be designed and constructed to city standards. The developer shall pay for installation of the station, including telemetry equipment (SCADA) for remote monitoring of the equipment by the city for both public and private (where applicable) owned stations.
- b. The city may require upsizing of existing and proposed sewer mains and lift stations to provide adequate capacity to the development area or future projects.
- c. In general, future sanitary sewer main extensions shall be publicly owned. The developer may request that a sanitary sewer main be privately owned if it is not located within the city right-of-way and where it will not serve any future development. Privately owned sanitary sewer mains also require permitting from the Building Safety Division and a Homeowners' Agreement.
- d. Minimum cover on sanitary sewers shall be six feet. Maximum cover on sanitary sewers shall be 15 feet without prior approval of the City Engineer.
- e. Minimum slope on all publicly owned eight-inch sanitary sewer mains shall be 0.5%.
- f. All drop manholes for eight-inch mains shall be inside drops as shown in the *City of Duluth Standard Construction Specifications*. For mains larger than eight-inch diameter, the design engineer shall recommend a drop structure for review by the City Engineer.
- g. All dead end sanitary mains shall have a manhole at the end.
- h. Sanitary or storm manholes shall not have steps.
- i. Manholes for new construction shall have a minimum drop of 0.10 feet from the upstream invert to the downstream invert.
- j. All new sanitary sewers will be inspected by the City with closed-circuit television. Coordinate sanitary sewer televising at least one week in advance. The engineer shall coordinate this by contacting Utility Operations at 218-730-4130. All other testing shall be witnessed and certified by the Engineer.
- k. Sanitary sewer extension permits should be completed and forwarded to the Engineering Division along with WLSSD permit information. WLSSD forms are available on their website at [www.wlssd.duluth.mn.us](http://www.wlssd.duluth.mn.us). Following review and approval by the city, signed forms shall be collected by the developer and forwarded to WLSSD along with the appropriate payment.

### Consent Decree

The City of Duluth and WLSSD are bound by a Consent Decree filed with the United States Department of Justice and the Environmental Protection Agency. This Consent Decree limits the volume of any sanitary sewer extension to 10,000 gallons per day or less when located upstream of an identified sanitary sewer overflow. This includes all extensions located in city sanitary sewer basins one through 11 and 13 through 26. Basins 27, 28, 29, and 30 have no restrictions. A general map of the sanitary sewer basins is included in Appendix G. Specific limits of basins can be obtained in Engineering.

Infiltration and inflow removal work by the developer may be required when the wet weather design flow exceeds 10,000 gallons per day, and will be determined on a case by case basis. All costs for this work shall be borne by the developer.

#### **D. Storm Water**

The city's storm water system is the natural and manmade system that moves precipitation from rain and snow storms through the city to Lake Superior. The system includes ditches, culverts, creeks, streams, catch basins, pipes, and includes streets with curb and gutter. The city is responsible for providing a system that works to prevent flooding and removes storm water from the city, while at the same time insuring that the quality of the water in the creeks, streams and lakes is not diminished. The Federal Clean Water Act requires the city to obtain a storm water permit that demonstrates the city takes responsibility for preventing pollution from entering our natural waterways.

When developing a project in the City of Duluth, the following storm water policies, permits and codes shall be followed:

- a. City of Duluth Unified Development Code. A copy of the storm water portion of this code is included in Appendix I
- b. City of Duluth Municipal NPDES Separate Storm Sewer System (MS4) Storm water Permit; and.
- c. MPCA NPDES Construction Activity (CA) Storm water permit.

#### **Plumbing Code Review (Building Safety) versus Engineering Division Review**

The City policy for review, approval and permitting will be as follows:

- a. The Building Safety Division will have responsibility for plan review, permits and inspection of the storm water conveyance system within a site. Including all piping which conveys rain water to a legal point of disposal, which will be an engineered storm water treatment system or the connection point to the Public Storm Sewer System or natural drainage course. Plumbing permits will be issued for this work and all design shall follow the requirements of the MN Plumbing Code.
- b. The transition from plumbing to the engineered storm water treatment system shall take place at a drainage structure (manhole, catchbasin, outlet apron or other structure but not a cleanout) that is located a minimum of 10 feet from the building. The plans shall clearly delineate this transition location.
- c. Engineering will have responsibility for plan review, permits and inspection for the engineered storm water treatment system and downstream system which will include all piping and treatment facilities that are not considered plumbing. No plumbing permits will be issued for the engineered storm water treatment system. All design shall follow the requirements of the City Engineering Guidelines.

- d. Where new storm sewer will be owned by the City (via easement or within R.O.W.), the plans shall clearly delineate the limits of public versus private ownership.

### Runoff Rate Control

Runoff rate control is beneficial in the upper, flatter part of the watershed above the escarpment. Below the escarpment, or bluff line, the topography is relatively steep and storm water flows quickly to Lake Superior and the St. Louis River. This bluff line designation is shown on the NRO Map. The storm water rate control requirements for development and redevelopment are shown in the UDC.

### Unified Development Code (UDC)

The City of Duluth UDC includes specific requirements for both temporary and permanent erosion control and water quality requirements and discharge rate controls. A copy of this code is included in Appendix I. The design engineer shall review the code to determine the specific submittals required for each project. In addition to the submittals listed in the Code, additional submittals are included within this section.

### MPCA MS4 Permit Summary/Requirements/Guidance

The City of Duluth is an MPCA designated Municipal Separate Stormwater System (MS4) NPDES Permit holder with a special "selected-NonDegradation" status that results in stringent requirements for stormwater discharge. Additionally, Lake Superior is a MPCA designated Outstanding Value Resource Water (ORVW) which requires additional stormwater discharge restrictions. Duluth is required to minimize impervious surface so as to reduce the total runoff volume load of storm water to the level that occurred prior to 1988. Duluth must also have specific methods to eliminate new and expanded (storm water) discharges

The current City of Duluth MS4 permit states that no "new or expanded" storm water discharge to Lake Superior should occur. This implies that all storm water runoff from newly installed impervious surfaces shall be fully contained on site and infiltrated whenever possible. When this is not possible, the developer must restrict discharges to the maximum extent possible (MEP). During planning, preliminary design and final design, the developer shall document what actions were taken to avoid, minimize and mitigate the volume of storm water produced.

The pollutants specifically identified in the MS4 permit are total stormwater Volume (TVOL), total suspended solids (TSS), and total phosphorus (TP). Proposed Projects must go through certain steps, beginning with initial planning, and use the most aggressive standards feasible to restrict pollutant discharge.

Methods to restrict discharge include:

- a. Site Planning to reduce impervious footprint of the project;
- b. Utilization of Low Impact Development (LID) Methods;
- c. Designation of Buffer areas;
- d. Select Vegetative methods for pollutant uptake;

- e. Infiltration Analysis – with consideration of soils/pollutant transport;
- f. Biofiltration/Filtration Analysis;
- g. Water Quality Ponds/Filters/other pollutant removal methods.

A Drainage Report must be submitted by the developer that documents the steps that were taken to restrict the stormwater discharge to the MEP level. Utilization of Low Impact Development methods should be evaluated for all projects.

#### Preliminary Design Submittal Worksheet

A preliminary design submittal worksheet shall be prepared at the start of all projects during preliminary design and prior to platting. This worksheet is designed to provide initial project information to the city and alert engineers and developers of storm water requirements prior to the start of the project. A copy of this worksheet is included in Appendix J. The worksheet shall also be included in the drainage report. A meeting with the City Engineering Department is required as part of the preliminary design.

#### Infiltration/Filtration System Evaluation Worksheet

The infiltration/filtration system evaluation worksheet included in Appendix K shall be submitted with all projects as part of the Drainage Report.

#### Storm Water Pollution Prevention Plan (SWPPP)

A SWPPP is required for all projects as defined in the UDC. An example of a SWPPP is included in Appendix L

#### Amendments to SWPPP's

The permittee shall amend and resubmit the plan if:

- (1) There is a change in design, construction, operation or maintenance at the site which has the reasonable potential for the discharge of pollutants to waters of the state and which has not otherwise been addressed in the plan; or
- (2) The actions required by the plan fail to reduce the impacts of pollutants carried by construction site storm water runoff.
- (3) If the department notifies the permittee of changes needed in the plan, the permittee shall submit, within the date specified in the notice, the changes in the plan.
- (4) For those projects for which there has been earlier department review of the project, if the permittee identifies changes needed in the plan, the permittee shall notify the department within five days of intent to change the plan.

#### Design Rainfall Event

Rainfall events or runoff events within the City shall be defined as outlined below:

- b. The 2-year, NRCS Type II rainfall event is defined as 2.6" of rainfall in 24 hours.
- c. The 10-year, NRCS Type II rainfall event is defined as 3.8" of rainfall over 24 hours.

- d. The 100-year, NRCS Type II rainfall event is defined as 5.3" of rainfall over 24 hours.
- e. The 100-year 10-day snowmelt is defined as 8.1" of runoff (frozen ground conditions).

### Drainage Report

The drainage report is the required format for submitting the technical hydrologic analysis. While there is flexibility in the Hydrologic and Hydraulic (H & H) model you choose to use, the report format, including the numbering and content of paragraphs, should be closely followed.

- A drainage report shall be submitted to the city for review with all projects.
- All reports shall be complete. Incomplete reports will not be reviewed.
- Project plan review will not begin until the hydrologic/drainage report is submitted.
- A modeling program or software appropriate for the size and type of development shall be used for all storm water calculations.
- All reports shall be signed by an engineer registered in the state of Minnesota.
- The drainage report submittal cover sheet and checklist shall be included with the Drainage Report. A copy of this check list is included in Appendix M.

#### *a. Report Recommendations*

- i. Emphasize storm water volume reduction, in addition to total suspended solids (TSS) and Phosphorus. (Over and above rate control and water quality requirements and drainage reports normally required for development in the City of Duluth). The volume reduction strategy must identify specific actions that will be taken to reduce volume for both new development and redevelopment projects. Volume reduction measures associated with public works projects should also be included as part of this strategy. (Chapter 3 of the Minnesota Storm water Manual is referenced for volume reduction techniques which should be incorporated into projects).
- ii. Incorporate measures to retrofit existing storm water infrastructure as redevelopment opportunities arise with Best Management Practices (BMPs) that reduce volume and provide treatment.
- iii. Implementation will occur as street reconstruction projects and other city redevelopment projects are completed.
- iv. Use the most aggressive standards feasible to aid the city in reducing storm water total volumes to Lake Superior.
- v. Evaluate storm water total volume, TSS and Total Phosphorus (TP) as indicator parameters.
- vi. If the project developer proposes a new or expanded discharge, then a "prudent & reasonable" analysis of alternatives must be done and clearly documented with sufficient detail.
- vii. If proceeding to make the argument that there are no prudent and feasible alternatives to eliminating the discharge, submit an assessment demonstrating how you:

- Identified and analyzed the new or expanded discharge(s) to the ORVW and,
  - Considered alternative methods to discharging and analyzed their potential to eliminate the discharge and,
  - Arrived at the conclusion that there are no prudent and feasible alternatives to discharging based on analysis of both cost and environmental considerations.
- viii. The MPCA reserves the right to make the final determination of all prudent and feasible alternatives and determine whether the methods proposed are significant enough to preserve the high quality of the ORVW.
- ix. Document project planning and development steps from concept and preliminary planning to show avoidance and minimization of the amount of impervious footprint of the project.
- x. Narrate Low Impact Development (LID) process to show lessened impervious impact.
- xi. Where impervious area has increased, document the feasibility of infiltration of in-situ soils, geology, and topography of the project area. Provide a comprehensive summary of soils data to support the prudent and feasible analysis.
- xii. Describe in detail the mitigation measures that were used to combat pollution load increase, filtration in lieu of infiltration, wet water quality ponds, micro-detention areas (rains gardens, etc.).
- xiii. Full MS4 NPDES Permit can be viewed at:  
[www.pca.state.mn.us/publications/wq-strm4-51.pdf](http://www.pca.state.mn.us/publications/wq-strm4-51.pdf) - Minnesota Stormwater Manual: [www.pca.state.mn.us/water/stormwater/stormwater-manual.html](http://www.pca.state.mn.us/water/stormwater/stormwater-manual.html)

*b. Report Format*

The following are the minimum standards for all Hydrologic/Drainage Reports:

- i. Table of Contents with appendices listed (Drainage report submittal coversheet and checklist)
  - ii. Introduction/Executive Summary
  - iii. Narrative describing type of development, number of units, phases, etc.
  - iv. Describe pre- and post-conditions (acreages, topography, watersheds, impervious change, models used, evaluation methodology and analysis, results and recommendations, special waters, special conditions).
  - v. Runoff rate/volume calculated for at least the 2-year, 10-year, and 100-year, 24 hour Type II storms
  - vi. Use pre-development vs. post-development charts to summarize findings or change in flow.
  - vii. Include all maps, drawings, details, and use 11x17 fold-out drawings in the report
- Pre-Development Conditions
    - a. Discuss size of site, watershed(s), existing drainage pattern, etc.
    - b. Discuss existing rates of runoff and how they were calculated, methodology, and all assumptions.

- c. Show and very clearly delineate all runoff routing diagrams with topography shown.
  - d. Highlight all catchment areas, ponds, reaches, links, etc. (i.e., a clear schematic of all routing).
- Post-Development Conditions
  - a. Discuss development and analysis/opinion on drainage patterns and how site should function during rainfall events. What percent of runoff will not be routed to each pond/BMP?
  - b. Discuss mitigation rationale and design methodology used.
  - c. Cite design assumptions.
  - d. Clearly show outlet design details.
  - e. Show pre- and post-hydro graphs.
  - f. Discuss function of any BMPs/ structures and use rating curves, water quality charts, etc.
  - g. Conclusions/Recommendations
  - h. Engineered site meets the city of Duluth and/or MPCA NPDES Construction and MS4 Permit (if applicable) regulatory requirements.
  - i. Include maintenance requirements for the detention pond, structures or any other systems.
  - j. Any other recommendations.
- Drawings
  - a. All plans shall be 11" X 17".
  - b. All plans shall be attached to the drainage report.
  - c. Show existing runoff with drainage arrows.
  - d. Show proposed runoff with drainage arrows, structures/ponds, special devices, and show flood routing.
  - e. Clearly show routing of all runoff/drainage for the entire route to the receiving water (major system). Include all property ownership on the drawings for the entire route to the receiving water, including abutting property ownership of drainages.
  - f. Include a data chart for each pond (and update with record drawing)
- Appendices
 

Design worksheets/modeling printouts/calculations, Preliminary Design Submittal Worksheet, Infiltration/Filtration System Evaluation Worksheet, etc.
- Record Drawings
  - a. Include as-built chart for each pond with all elevations and pond data.
  - b. At a minimum include the following: contribution area, bottom elevation, live storage, dead storage, discharge rates for 2-year, 10-year, 100-year events, high water (HW) elevations from each event and addition.
  - c. See additional record drawing requirements under Post-Construction Submittals.
- General Notes
  - a. Drainage report may be combined with the SWPPP, but still must have the elements noted above.

- b. For ponds or other water quality or detention structures, report must contain a section clearly describing: ownership, function, and periodic maintenance requirements.
- c. For structures to be owned and maintained by a Homeowners' Association, submit a copy of that agreement with sufficient detail clearly delineating between City of Duluth and private ownership. Submit Developers Agreement/MOU sections that pertain to storm/surface water.

### Storm Water Design Requirements

Design of storm water infrastructure shall meet the following minimum requirements:

- a. Minimum grade shall be maintained to provide for a minimum velocity of three feet per second in storm drains (Reference MnDOT DM8.9.4). A target grade of at least 2% should be used for all catch basin leads.
- b. Minimum pipe size shall meet the 10-year design requirement or as otherwise directed by the City Engineer.
- c. Curb inlets (or "curb boxes") shall not be installed on steep continuous grades. A slope of 8% or greater is considered steep.
- d. Curb and gutter inlets (or "curb boxes") shall be used at sag points. The engineer shall consider flanking inlets at critical points, especially where overtopping of curb may cause scour, property damage, etc.
- e. A catch basin inlet clogging factor of 50% shall be used for analysis.
- f. The construction plans shall show overflow paths at all sags for curb overtopping. The plans shall also show the overflow/ flood flow routing and include **ALL** property owners along the overflow routing.
- g. For ponds and outlets, show overflow path for all outlets. Include emergency outlet all the way to the major receiving system. The plan must identify **ALL** property owners and their parcels in the flood flow routing.
- h. Rip rap used in ditch sections shall be specified with at least two fractured faces for all classes.
- i. Geotextile fabric shall be installed under all rip rap. Granular filter may be used under the fabric.
- j. Precast concrete manholes and catch basins shall be used for all installations unless approved otherwise by the City Engineer. Catch basins shall not have a sump area.
- k. Storm manholes shall have concentric cones and no steps.
- l. Storm water pipe shall be reinforced concrete pipe (RCP) or HDPE in accordance with the city construction specifications and a minimum of 12" in diameter. HDPE should be used for all catch basin leads where adequate cover is available. HDPE may be used for storm sewer mains on a case by case basis.
- m. Erosion control and protection may be required by the City Engineer. Erosion Control Blankets (ECB) and Turf Reinforcement Mats (TRM) are widely available. Specific use, application, and product choice shall be submitted to the city

engineer for approval prior to or at the 35% design. Indicate on the submittal whether product is on the MnDOT (or WisDOT) current approved products lists.

## **VI. PLAN SUBMITTAL REQUIREMENTS**

- a. All project plans with infrastructure proposed to be owned by the city shall be submitted to Engineering for review and signature.
- b. Plan and specification submittals to Engineering shall include only items to be turned over to the public, traffic control plans and all erosion control and storm water facilities (both public and private) including the SWPPP. Items not intended for review by Engineering should not be submitted.
- c. All final plan sets shall have a title sheet on 20 pound vellum paper, Minimum information required on the title sheet shall be the project name, year of construction, city project number, project location map, a listing of governing specifications, block containing the name and address of the designing consulting firm, signature blocks for City Engineer, Chief Engineer of Utilities, Chief Engineer of Transportation, a signature block for the engineer of record and a listing of the quality of underground information with Gopher State One Call number. An example title sheet for city projects is included in Appendix N. A copy of the AutoCAD template is available upon request.
- d. All plan sets submitted to Engineering shall be 11 x 17 inches in size. No other sizes shall be accepted. Five copies of the review plans shall be submitted. One copy of the final set for signature shall be submitted. Email submittals will not be accepted.
- e. When details from the city's *Standard Construction Specifications* are used and referred to in the plan, an illustration of the detail may or may not be required, as directed by the city engineer. The details referenced in the plan shall be, at a minimum listed in the plan. If a detail is included on the plan in its original form, then it shall include the city of Duluth detail number. If the detail is modified in any way, the Duluth detail number shall not be included. Any modifications shall be clearly indicated in the construction notes, the plan, and in the special provisions.
- f. All plan sets shall use the following AutoCAD standards:
  - Minimum text size of 0.08"
  - Minimum line weight of 0.1500mm.
- g. The projected coordinate system used for all projects shall be the St. Louis County Transverse Mercator System 96:
  - Projection: Transverse\_Mercator
  - False\_Easting: 4757208.33333333
  - False\_Northing: 3280833.33333333
  - Central\_Meridian: -92.45000000
  - Scale\_Factor: 0.99998529
  - Latitude\_Of\_Origin: 46.61666667
  - Linear Unit: Foot\_US
  - Geoid: (Current)

## **VII. POST CONSTRUCTION SUBMITTALS**

Upon completion of any project with public improvements, the project engineer/manager will submit the following to the city:

- Record drawings
- CADD files for complete plan set
- CSV files
- Original item record account
- Original inspector field notes
- Original survey notes
- Water main check-off list (Appendix O)
- Valve installation record (Appendix P)
- Hydrant installation record (Appendix P)
- Water service installation records (Appendix P)
- Sanitary Sewer Wye Record (Appendix H)
- Electronic copy of final coordinates for alignment points, control points, and monuments on compact disk in a .txt or .asc format.
- Letter recommending acceptance by the city and certifying project is complete and installed to city standards signed by the Engineer.

### **A. Record Drawings**

All changes from the original plan built into the project shall be printed or lettered in red permanent ink upon the original plan.

For all projects, prepare complete record drawings whether there were any changes from the “as let” plan or not. For City of Duluth projects, final payment for engineering services will be withheld until all final documents have been reviewed and approved. For private projects, acceptance of the street and/or utilities will be withheld until all final documents have been reviewed and approved.

All record drawings shall be signed by the engineer of record.

All record drawings shall be delivered to Mick Thorstad, Senior Engineering Technician, in the Engineering Division. In addition to record drawings, CADD files and other electronic documents will be required for inclusion into the city’s GIS system.

#### **1. General Record Drawing Requirements**

- a. The original/record drawing plan will be on 11”x17” vellum paper, 20 pound. All pertinent signatures shall be on the original plan. The vellum cover sheet from the original bid plans may be reused on the record drawings.
- b. The city requires one (1) electronic copy on compact disc (.dwg format) in the current AutoCAD version used by the City of Duluth, unless prior arrangements have been made. The electronic copy will show who signed the original drawings and date. The corrections will be on a record drawing layer. All cross-

reference drawings, non-standard fonts, and shape files will be part of the electronic copy.

- c. The special provisions will be part of the electronic copy. The special provisions will be created in Microsoft Word.
- d. Plan changes shall be in red or italicized. Line out or cross out all changed original information so it is still readable. Write the corrected information above the original or close to it where possible. Urban plans or those with much detail may require some alternative approach in order to be legible, such as numbered changes shown on the plan sheets with corrective information and wording shown on supplemental non-plan sheets.
- e. Use a red fine-line felt pen for making any hand plan changes. Print or letter changes. Do not write longhand. Print or letter larger than the original. Use blank spaces on the plan so notes are not superimposed.
- f. Insert replacement sheets in the plan. To do this, renumber them similarly to the original plan sheets. For example, sheet 5A would replace sheet 5. Retain all original sheets that are replaced and cross them out; write down the sheet number of its replacement sheet on the crossed-out sheet. Note the sheet changes on the listing of plan sheets. Take the plan apart, insert each replacement sheet directly after the old sheet it replaces, and restaple. Do not staple replacement sheets directly to old sheets.
- g. If the plan has no changes, indicate such by the phrase "NO PLAN CHANGES" on the title sheet. If individual sheets within a record drawing have no changes, indicate such by the phrase "NO SHEET CHANGES".
- h. If the charts have no changes, indicate such using the note "NOT UPDATED" on the charts.

## 2. Street and Utility Plan Record Drawing Requirements

The following notes should be included on the title, plan sheets and cross section sheets as applicable. This listing should be considered as a base and can be revised to fit the individual project needs.

- a. The words "RECORD DRAWING" in red upper case letters on the title sheet, centered in the top margin and at least ¼" high and dated.
- b. Grade changes and changes in elevation for footings, culverts, manholes, etc.
- c. Relocated private drives, noting the change in location and/or materials.
- d. Sidewalks (new, added, or removed).
- e. Changes in size and alignment of pipes.
- f. The record drawings shall include "as-built" coordinates in the coordinate system specified under PLAN SUBMITTAL REQUIREMENTS section with accuracy as specified elsewhere in this section. In addition, centerline stationing and offsets shall also be provided. The coordinates and stationing shall be provided for the following:
  - i. Sanitary manholes, sanitary wye connections, sanitary service bend fittings, sanitary service end caps, and service extensions.
  - ii. Storm manholes, catch basins, storm aprons, storm culvert ends, storm water treatment BMP boundaries and private service connections.

- iii. Infiltration and inflow pipes, private service connections, service bend fittings, service end caps, and service extensions.
- iv. Water main valves, water hydrant valves, water hydrants, water end caps, water pipe fittings, water service main connections, water service valve boxes and electro-fusion couplings.
- v. Gas main valves, gas service valves, gas tees and excess flow valves, main tees and elbows, and service tee locations.
- vi. Centerline dimension of street to right-of-way line and intersecting streets and right-of-way.
- g. Sub-cut areas, rock profiles, insulation of utilities, abandoned or discovered utilities.
- h. Storm water infrastructure, both public and private, including as-built chart for each pond with all elevations and pond data. At a minimum include the following: contribution area, bottom elevation, live storage, dead storage, discharge rates for 2-year, 10-year, and 100-year events and high water elevations from each event.
- i. Omissions, errors and discrepancies discovered during construction.
- j. Features added, revised or deleted by contract change orders.
- k. Changes in drainage and altered watercourses. Any additional perforated pipe and/or french drains.
- l. Material type, size and manufacturer where optional materials are allowed by specifications or approved field changes.
- m. Final pipe dimensions, details, sizes, material, numbers, locations, quantities, length, grades, and inverts elevations, if different from the original plan.
- n. Survey: See SURVEY REQUIREMENTS (Section VIII) for specifics on survey data required.

### 3. Structural Plans – Record Drawing Requirements

These notes should be included on the title and detail plan sheets as applicable. This listing should be considered as a base and can be revised to meet individual project needs.

- a. Record drawings for structural plans will be full size (up to 24"x 36").
- b. Corrected or new bench mark disk locations and elevations.
- c. Added or relocated utilities. Locate on the plan sheet and on the detail sheet if hanging from the superstructure.
- d. Changes in piling type and length. Note the range in length (shortest to longest) on the plan view of each substructure unit.
- e. Added or relocated piles, location, type and length.
- f. Expansion joint types where options are allowed. Indicate the size and manufacturer. Cross-out reference to joint type not used.
- g. Revisions, additions and deletions per contract change order.
- h. Final dimensions, alignments, elevations, detail sizes, lengths, numbers, and locations if changed from the plans.
- i. Controlling vertical clearances.
- j. Plain and protective surface treatment color, type and manufacturer.

- k. Size of riprap or other countermeasures to counter erosion/scour.
- l. Underwater problems encountered that may reoccur.
- m. Top of water elevation together with date taken.
- n. Vulnerability to scour code obtained from bridge designer.
- o. Profiles and cross sections of stream bed upstream and downstream.
- p. Angle of water attack relative to pier of abutment line.

## **B. Electronic Data Submittal**

In addition to the record drawings required above, the engineer shall furnish digital comma separated value (CSV) files for all projects with public improvements to provide location data for the following features:

- a. Sanitary manholes, sanitary wye connections, sanitary service bend fittings, sanitary service end caps, sanitary sewer couplings and the sanitary sewer pipe alignment.
- b. Storm manholes, catch basins, storm aprons, storm culvert ends, storm water treatment BMP boundaries and storm pipe alignments.
- c. Water main valves, water hydrant valves, water hydrants, water end caps, water pipe fittings, water service connections, water service valves, electrofusion couplings and the water main pipe alignment.
- d. Gas main valves, gas service valves, gas tees, excess flow valves and the gas main/service alignment. (include elevation)
- e. Tracer wire boxes.

The CSV files will provide field names along the top row that include feature name, northing, easting, elevation (natural gas only), and date coordinates captured. The dataset shall be in the coordinate system specified under plan submittal requirements. All coordinates within the CSV files shall be collected during and following construction and reflect the actual installed conditions. The horizontal accuracy of coordinates for buried items shall be within 1.0 foot. The horizontal accuracy of coordinates for exposed or above grade items that may be collected as part of the record drawing survey shall be within 0.1 foot. Vertical elevations items other than storm or sanitary sewer related objects shall be within 0.2 feet. Storm and sanitary sewer invert elevations shall be within 0.05 feet.

At this time, elevation data within the CSV file is only required on natural gas related items. Inverts for storm and sanitary items shall be shown on the record drawings.

## **VIII. SURVEY REQUIREMENTS**

The City of Duluth has established the following minimum requirements for survey data for the professional engineer and the developer to follow during the development, design, construction, and record drawing submittal for their project. The City of Duluth Engineering Division shall receive all original survey field notes, including all monument ties. Coordinate data shall consist of point number, northing, easting, elevation,

description, and date the data was captured. Data shall be delivered in a comma delineated format on both hard copy and on disc.

1. Horizontal Control Points:

- a. Use St. Louis County / Transverse Mercator 96 - NAD 83, in U.S. Survey Feet with at least 0.05 Ft. accuracy (used for city GIS mapping).
- b. Control Points shall be tied to minimum of two "HARN" monuments. (HARN monuments are available from St. Louis County and MnDOT.)
- c. Control points shall be placed so that pairs of points are visible from one another.
- d. Control points shall be tied out so they can be used throughout the project (from preliminary to final) and replaced after project completion, for future reference.

2. Bench Marks:

- a. Vertical Datum shall be NAVD 88 Datum with at least 0.01 Ft. accuracy.
- b. Verify elevations by tying into two (when practical, 1 minimum) USGS Bench Marks that have been adjusted to NAVD 88 Datum.
- c. Close bench circuits to assure accuracy.
- d. Spikes in poles, tops of hydrants, spikes in trees, etc. are considered temporary.
- e. Permanent bench marks should be set at every intersection and indicated on plans.

3. Monuments:

- a. All existing plat monumentation, used or impacted by the project, must be researched, field verified, maintained, tied out, and replaced if destroyed.
- b. Plat monuments shall be used to establish location of right-of-way, easements, roadway center lines, etc.
- c. Roadways shall be tied to existing plat monumentation and be centered on the right-of-way. Exceptions must be approved by the City Engineer.
- d. Final project control shall consist of Mag Nails placed at intersecting street centerlines and at every PC and PT along the design centerline where there are curves.
- e. Sawed X's shall be placed on the top of curb near intersections, to assist City inspectors during and after construction. The X's must be placed by the Developer or Consultant's surveyor within one week after the curbs are placed. The X's shall be placed on both sides of the street on a stable part of the tangent curb at an even +00 or +50 station. Label the station and offset on the curb with a permanent marker.
- f. When survey monuments are required by the City, the City shall supply castings, the cost of which shall be deducted from the developer's deposit. The Developer's surveyor shall set the monument. Refer to the *City of Duluth Standard Construction Specifications* for Duluth Standard Detail Sur 1, Survey Monument Installation.

4. Plans:

- a. Alignment sheet shall show coordinates and station and offsets for centerline alignment, PC's, PT's, PI's, street intersections, control points, plat monuments, etc.
- b. Centerline (C/L) to C/L distance shall be indicated on alignment sheet and plan sheets, tied into intersecting streets at C/L even if intersecting street is not on project. This is used for city's pavement management database.
- c. Charts shall include:
  - i. Survey control point chart with coordinates and descriptions
  - ii. Alignment chart with coordinates, azimuths for alignments, coordinate and station and offsets for alignment points, coordinate and station and offsets for curve data
  - iii. Bench mark chart
- d. Bench marks shall be indicated on each plan sheet with descriptions and elevations shown (Minimum one per 500'), usually at each street intersection.

5. Final Record:

- a. Indicate plat monuments in place, placed or replaced.
  - i. Reference "Survey Monumentation Preservation" memorandum dated October 31, 2001, and Minnesota statutes including but not limited to section 160.15 and section 505.02.
  - ii. By Minnesota statute, government corner monuments are to have certificate filed with County Land Surveyor's office; St. Louis County Land Surveyor's office will also accept certificates on plat monuments.
- b. Indicate any changes in control points.
  - i. Show final alignment points installed.
  - ii. Show final dimensions, alignments, elevations, coordinates for control points (sawed X's), alignment points and plat monuments.
  - iii. Show ties to monuments, control points and alignment points.
- c. Include electronic copy of final coordinates for alignment points, control points, and monuments on compact disk in a .txt or .asc format.
- d. Indicate corrected or replaced temporary bench marks.
- e. Notify appropriate governmental agency (County, MnDOT, USGS, etc.) of changes and or additions.

6. Minimum Specifications for Placement of Aerial GPS Targets within City of Duluth right-of-way:

- a. The location of all aerial targets, within city right of way or city controlled property, shall be approved by the City of Duluth, Engineering Division prior to placement.
- b. Painted target will comply with the current City of Duluth Standard Aerial Target Plate. Horizontal data shall be in St. Louis County Transverse Mercator 96 - NAD 83, in U.S. Feet with a minimum of 0.1 ft accuracy. Vertical Datum Shall be NAVD 88 in U.S. Feet. Coordinate data shall consist of, point number, northing,

easting, elevation, description. Data shall be delivered in a comma delimited format on both hard copy and on disc.

- c. Location of targets positioned on existing official survey markers shall be centered on the existing marker and the elevation shall be to the top existing surface (or top of monument casting). Targets not on survey markers shall be placed in a position where they can not be construed to be official survey markers, nor shall they imply to be roadway information for vehicles. The orientation of the target shall be approximately grid or magnetic north. A permanent point (nail, spike, pin, x, etc.) shall be placed at the center of the target.

Minimum Specifications for GPS Survey work:

- d. Data shall be tied to a minimum of two "HARN" monuments.
- e. Vertical Datum shall be NAVD 88 in U.S. feet.
- f. Verify elevations by tying into nearest USGS bench marks using differential leveling or trigonometric leveling.
- g. Set a minimum of two temporary bench marks.

## **IX. MISCELLANEOUS REQUIREMENTS**

### **A. Construction Inspection**

All public improvements shall have on-site inspection as necessary to confirm that all work adheres to the city approved plans and specifications. Underground utilities shall be inspected on a full time basis. All inspectors shall be required to obtain and maintain the appropriate inspection certifications for the work they are responsible to inspect.

### **B. City Expenses**

For all private projects, the city shall invoice the developer for all city costs associated with the public improvements, including, but not limited to, costs associated with plan review, construction inspection by city personnel, testing, including televising of underground utilities, survey monuments, and the review and acceptance of the public utilities.

The city may require within the Memorandum of Understanding that the developer tender a deposit with the city against which the developer authorizes the city to draw for payment for city expenses. The amount of this deposit and determination of the need for a MOU will be decided on a project specific basis. A typical MOU is provided in Appendix A.

### **C. Warranty**

All privately constructed projects shall have a warranty for a period of two (2) years for all public improvements turned over to the city. Such warranty shall include, but not be

limited to, repairs or corrective action due to improper construction or compaction. The warranty period shall commence upon acceptance of the project by the City Engineer.

**APPENDIX A**  
**Example: Memorandum of Understanding (MOU)**

**MEMORANDUM OF UNDERSTANDING**  
**between**  
**City Engineer for the City of Duluth, Minnesota**  
**and**  
**DEVELOPER**  
**relative to**  
**NAME OF DEVELOPMENT, Duluth, Minnesota**

This will serve as a Memorandum of Understanding between the City Engineer ("City Engineer") of the City of Duluth, Minnesota ("City") and **DEVELOPER** ("Developer") and will document specific understandings of both parties relative to the construction of public and private improvements associated with the development of the **NAME OF PROJECT** project within the City of Duluth, Minnesota. The public and private improvements, herein after referred to as the "Development" are shown on the attached Exhibit A. **(ATTACH AN EXHIBIT THAT DEFINES AND NOTES WHAT IS PRIVATE AND WHAT IT PUBLIC)**

Whereas, the Developer – as part of the Development – intends to proceed with the design and construction of public improvements at no cost to the City (**City Project No. \_\_\_\_\_**) and which improvements, upon completion of construction, will be turned over to the **(INSERT WHO WILL OWN OPERATE AND MAINTAIN )** for ownership, operation, and maintenance, and

Whereas, the City Engineer, in his or her capacity as city engineer for the City, has the authority to require that the public improvements constructed by a developer, which are to be turned over to the City and for which the City is to assume responsibility for maintenance and operation, be constructed in accordance with applicable City standards as determined by the City Engineer in the exercise of his or her discretion; and

Whereas, when such public improvements are so constructed, the City Engineer has the authority, in the exercise of his or her discretion, to accept such improvements and to undertake to have them maintained and operated by the City; and

Whereas, both the City Engineer and the Developer wish to memorialize various understandings relative to the public improvements for the Development.

Now, therefore, as indicated by signatures of appropriate representatives for both parties on this Memorandum of Understanding, it is jointly understood that:

1. The Developer intends to **(DESCRIBE THE PROJECT)** construct the public improvements within the Development privately and intends to turn over these improvements to the City of Duluth upon construction completion and acceptance by the City. The Developer agrees to dedicate any necessary utility easements and access rights of way within the Development to the City prior to the City's acceptance of those utilities.

2. The Developer intends to construct private improvements within the Development which will remain private following construction, and the (DEFINE WHO WILL BE RESPONSIBLE –developer, homeowners association??) will be responsible for the ownership, operation, and maintenance of those improvements. (define responsibilities of homeowners association here or in a separate document, if lengthy)(The entity that is supposed to survive, assuming that what is called a “Common Interest Community is to be formed, is a “Master Association” which is governed by a document called “Master Declarations”.)
3. The design of all public improvements covered by this agreement shall comply with applicable City engineering standards as determined by the City Engineer and shall have been approved in writing by the City Engineer prior to the commencement of the construction, thereof. Thereafter, any changes in said plans, other than standard field modifications, shall be similarly approved.
4. The construction of all public improvements will comply with applicable City engineering standards as determined by the City Engineer, and all construction of the public improvements will be regularly inspected by an engineering consultant approved by the City Engineer. The Developer shall require by contract that its engineering consultant deem the City Engineer and the City to have the status of a “client” of such consultant for purposes of the work performed by such consultant related to the Development, and particularly as such status reflects on the consultant’s duties to provide accurate and timely information and reports to their clients on the progress of such work and problems related thereto, all in accordance with professional standards common to the profession within the area. It is currently understood by both parties that NAME OF ENGINEERING FIRM will serve as the Developers engineering consultant for the design and construction of the public improvements.
5. Prior to the City Engineer’s approval of the plans and specifications for the public improvements, the Developer will tender a deposit of 20% (Define amount) of the construction costs, against which the Developer authorizes the City to draw for payment of City costs associated with the public improvements, including, but not limited to, costs associated with plan review, construction inspection by city personnel, testing, including televising of underground utilities, and the review and acceptance of the public utilities. In addition, the Developer understands that the deposit may be used to correct work not performed or work requiring corrective action whether or not such work is warranted as provided for in Paragraph 17 below or not, if the Developer’s contractor fails to complete the work to city standards or to correct defects in such work in accordance with the requirements of this Agreement..
6. (DELETE THIS IF NO SANITARY SEWER IS BEING CONSTRUCTED AND NOTE “THIS PARAGRAPH INTENTIONALLY LEFT BLANK”)As part of the public improvements, the Developer will construct sanitary sewer mains with sufficient capacity, as determined by the City Engineer, to receive all sanitary sewer flows anticipated to be required for any and all future development as is currently known or expected to occur

within the area which would be served by such utilities as determined by the City Engineer. In addition, the Developer will meet the conditions of the sanitary sewer system extension permit from the Minnesota Pollution Control Agency (MPCA) as required for the Development.

7. (DELETE IF NO WATER MAINS ARE BEING CONSTRUCTED AND NOTE "THIS PARAGRAPH INTENTIONALLY LEFT BLANK") As part of the public improvements, the Developer will construct water mains with sufficient capacity, as determined by the City engineer, to provide adequate flow of water for any and all future development as is currently known or expected to occur within the area which would be served by such utilities as determined by the City Engineer.
8. ARE THERE ANY PRIVATE WATER MAINS? (DELETE IF NO PRIVATE WATER MAINS AND NOTE "THIS PARAGRAPH INTENTIONALLY LEFT BLANK") Private Water System. (DEVELOPER ) agrees to forever maintain in good condition the private water system and private hydrants. All work to be performed by (DEVELOPER ) under this paragraph, including work or modifications carried out at the request or direction of the City, shall be paid for solely by (DEVELOPER ) and its successors in interest, if any, and at no cost to the City.
9. Prior to the issuance of individual service permits, the Developer's engineer shall furnish record drawings prepared in accordance with City of Duluth "Record Drawings" requirements found in Section VII of the *Engineering Guidelines for Professional Engineering Services and Residential and Commercial Developments*. These drawings shall indicate all changes made during construction.
10. IS THERE A SANITARY SEWER OVERFLOW TANK?? (DELETE IF NO SANITARY SEWER OVERFLOW TANK AND NOTE "THIS PARAGRAPH INTENTIONALLY LEFT BLANK") Private Sanitary Sewer Overflow Tank. (DEVELOPER ) agrees to construct the tank and forever maintain in fully operational condition the sanitary sewer overflow tank as shown on the approved plans and specifications. (DEVELOPER) shall abide by the staffing, response times and other operating procedures of the overflow tank as set forth in the tank operation plan (attached). The City reserves the right to require modification of the operational plan to meet requirements of the MPCA, WLSSD or the City of Duluth. DEVELOPER agrees to implement and respond to reasonable requests to revise the tank operation plan from time to time to meet requirements of WLSSD or the City Engineer. The City of Duluth reserves the right to require demolition or abandonment of the tank in the future at no cost to the City. All work to be performed by DEVELOPER under this paragraph, including work or modifications carried out at the request or direction of the City, shall be paid for solely by DEVELOPER and its successors in interest, if any, and at no cost to the City.
11. ARE THERE STORM WATER IMPROVEMENTS THAT NEED MAINTAINED IN THE FUTURE BY THE DEVELOPER??? (DELETE IF NO STORM WATER

**IMPROVEMENTS AND NOTE "THIS PARAGRAPH INTENTIONALLY LEFT BLANK")** As part of the private improvements, the Developer will construct a storm water system including permanent storm water quality improvements. The storm water system will have sufficient capacity to receive all storm water flows for any and all future development as is currently known or expected to occur tributary to the project area. Developer agrees to forever maintain and repair as necessary the permanent storm water improvements to be constructed as a partial requirement of the MPCA NPDES Stormwater permit and the City of Duluth Municipal Separate Storm Sewer System (MS4) Stormwater Permit. Changes to the storm water improvement construction or operation must be reviewed and approved by the City Engineer. All work to be performed by the Developer under this paragraph, including work or modifications carried out at the request or direction of the City, shall be paid for solely by the Developer and its successors in interest, if any, and at no cost to the City.

12. The Developer will give formal notice to the City Engineer upon completion of the public utility improvements via certification by the Developer's engineering consultant that the public improvements have been constructed in complete accordance with applicable City engineering standards, as well as the approved plans and specifications. Upon receiving such notice/certification and record drawings, the City Engineer will inspect the public improvements. If the public improvements are in conformance with the applicable requirements, the City Engineer will direct that the City will assume ownership, operation and maintenance of them. If the public improvements are not in conformance with the applicable requirements, the City Engineer will provide formal notice to the Developer of the need for repair or replacement before the City assumes ownership, operation, and maintenance of them.
13. Until such time as ownership, operation, and maintenance of the public improvements is formally accepted in writing by the City Engineer, their operation and maintenance will be solely the responsibility of the Developer. This includes locating of pipes in accordance with the requirements of the Gopher State One Call System and plowing of snow for new City Streets.
14. Future repairs of public utilities will be completed by the City or their designated contractor. Following excavation for any utility repair on private property, the Developer is responsible for final surface restoration.
15. The Developer hereby agrees that it will defend, indemnify and hold harmless the City, the City Engineer and all other officers, agents, servants, employees and contractors of the City from and against any and all liability arising in any way out of the design and construction of the Development and, upon ten (10) days notice from any such party will appear and defend such party against any action of any kind arising out of this obligation. Provided, however, that nothing herein shall be deemed to require the Developer to defend, indemnify or hold harmless any such party from Liability arising out of such party's active or intentional negligence or intentional acts; provided, however, that such

obligation shall not apply to such liability arising from the ownership, operation and maintenance of the improvements as undertaken by the City.

16. The Developer agrees that it will require that the City Engineer and the City be named as additional insured on all insurance policies required by the Developer from its engineering consultant as referred to in Paragraph 4 above and from all contractors providing services to the Development and will require that certificates of insurance be promptly furnished to the City Engineer evidencing such coverage. \*
17. The Developer agrees to warranty the utilities that are turned over to the City for ownership for a period of two (2) years after acceptance by the City Engineer. Such warranty shall include, but not be limited to, repairs or collective action due to improper construction or compaction.
18. Although the City Engineer has the authority to review and approve various plans and specifications for the improvements to be constructed as part of the Development, the City Engineer is not to be considered the project engineer for the purposes of the design or construction of the Development's streets and utilities, and the approval of the City Engineer of the design or construction or both of said streets and utilities shall not be a guaranty of the sufficiency or quality of said streets or utilities or of their compliance with codes applicable to such work. The City Engineer shall not be responsible for any errors or omissions of any kind whatsoever related to the design or construction of such improvements or any damages arising therefrom including consequential damages, whether to the Developer, to its engineering consultant or to any third party. The Developer agrees that, as between itself and the City and the City Engineer, it shall be solely responsible for any liability arising out of the design and construction of such improvements.
19. This Memorandum of Understanding may be executed in two or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

City Engineer of Duluth, Minnesota

Developer

Cindy Voigt, P.E.  
City Engineer

name  
title

Date: \_\_\_\_\_

Date: \_\_\_\_\_

**Attach Exhibit A**

**APPENDIX B**  
**Application to Make Public Improvements Privately**

Application Number \_\_\_\_\_ Date \_\_\_\_\_  
Project Number \_\_\_\_\_

**City of Duluth Engineering Division**  
**Application to Make Public Improvements Privately**

Application is hereby made to (describe proposed improvements):

I/we hereby agree to do all work relating to the above described project in accordance with the plans and specifications approved by the city engineer.

I/we agree to pay all city costs incurred on the project in accordance with Chapter 45, Article VII of the Duluth City Code and amendments thereto.

I/we hereby tender a deposit of (AS PER MOU, IF APPLICABLE) \_\_\_\_\_, against which I/we authorize the city to draw for payments of such costs. I/we further understand that this deposit is not guaranteed to be the actual costs and agree to reimburse the city for such additional costs if such costs should exceed this deposit. The city agrees to refund any excess upon completion and acceptance of said work.

Upon completion to the satisfaction of the city engineer, I/we hereby ask the city to accept the above described project as a public improvement.

Name of Applicant(s)	Signature	Address	Date

\*\*\*\*\*

**Permit for Public Improvements Made Privately**

Permit Number \_\_\_\_\_ Date \_\_\_\_\_

This is to certify that \_\_\_\_\_ (contractor) has been granted permission to make public improvements as described above in accordance with Chapter 45, Article VII of the Duluth City Code and amendments thereto and agrees to complete this project on or before \_\_\_\_\_ (date).

\_\_\_\_\_  
(initial) copy to project file

\_\_\_\_\_  
Permittee (contractor)

\_\_\_\_\_  
(initial) copy to insurance file

\_\_\_\_\_  
Approved by City of Duluth

**APPENDIX C**  
**Street Extensions Standards for Limited Residential Development Matrix &**  
**Standard Termini**

## Street Extensions Standards for Limited Residential Development Matrix & Standard Termini

### Street Extensions Standards for Limited Residential Development - Minimum Requirements

		Existing Street - 300 feet or less		
		Extended 100 feet or less	Extended 100 to 300 feet	Extended greater than 300 feet
Existing Street	City of Duluth Standard	Gravel Street	Rural Bituminous	Urban Bituminous
	Width of Street	20'	20'	28'
	Surfacing Material	gravel	gravel	bituminous
	Concrete Curb & Gutter			Yes
Proposed Extension	City of Duluth Standard*	Gravel Street	Rural Bituminous	Urban Bituminous
	Geotextile Fabric	Type 5 (non-woven)	Type 5 (non-woven)	Type 5 (non-woven)
	Select Granular Backfill (mod<7%)	12"	12"	12"
	Class 5 Granular Base	8-1/2"	8-1/2"	8-1/2"
	Width of Street	24'	24'	28'
	Drainage	as per City Engineer	as per City Engineer	as per City Engineer
	Surfacing Material		bituminous	bituminous
	Depth of Surface Material		3"	3-1/2"
	Width of Surfacing		22'	28'
	Concrete Curb & Gutter (B624)			Yes
		Existing Street - longer than 300 feet		
		Extended 100 feet or less	Extended 100 to 300 feet	Extended greater than 300 feet
Existing Street	City of Duluth Standard	Gravel Street	Rural Bituminous	Urban Bituminous
	Width of Street	20'	20'	20'
	Surfacing Material	gravel	gravel	gravel
	Concrete Curb & Gutter			Yes
Proposed Extension	City of Duluth Standard*	Gravel Street	Rural Bituminous	Urban Bituminous
	Geotextile Fabric	Type 5 (non-woven)	Type 5 (non-woven)	Type 5 (non-woven)
	Select Granular Backfill (mod<7%)	12"	12"	12"
	Class 5 Granular Base	8-1/2"	8-1/2"	8-1/2"
	Width of Street	24'	24'	28'
	Drainage	as per City Engineer	as per City Engineer	as per City Engineer
	Surfacing Material		bituminous	bituminous
	Depth of Surface Material		3"	3-1/2"
	Width of Surfacing		22'	28'
	Concrete Curb & Gutter (B624)			Yes

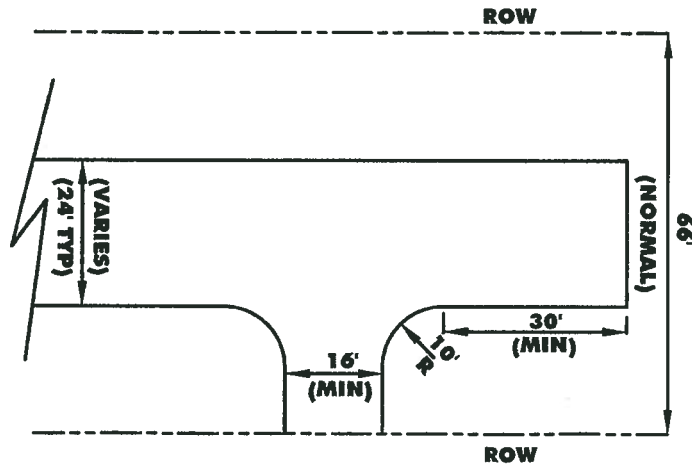
\* Or to standards matching the existing street, if greater

**City of Duluth**  
**Policy on Street Extensions for Limited Residential Development**  
**Standard Termini of Street Extension**

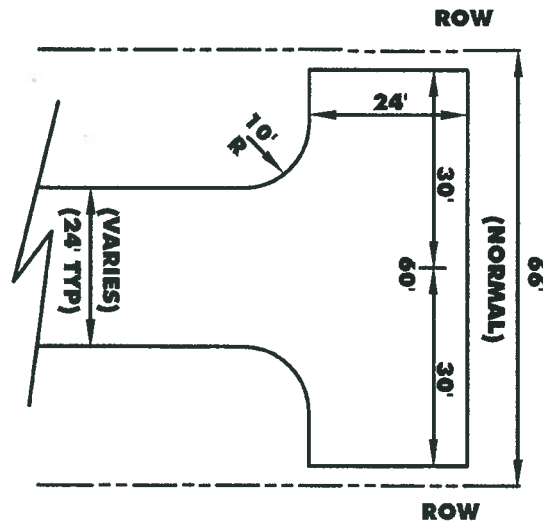
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Any street extended under this Policy shall terminate in the following manner based on the length of extended street. However, no extended street should terminate in a manner that would be consider "lesser" than the manner of termination of the existing street – except by variance of the City Engineer and/or the Special Assessment Board.

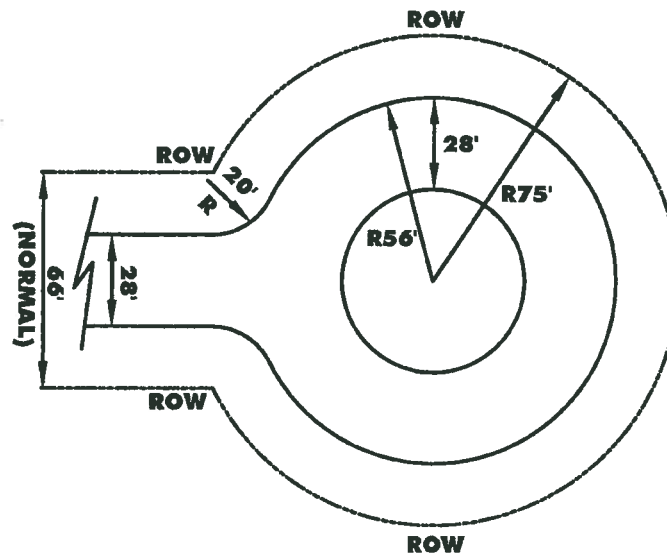
Street to be extended 100 feet or less.



Street to be extended 100 to 300 feet.

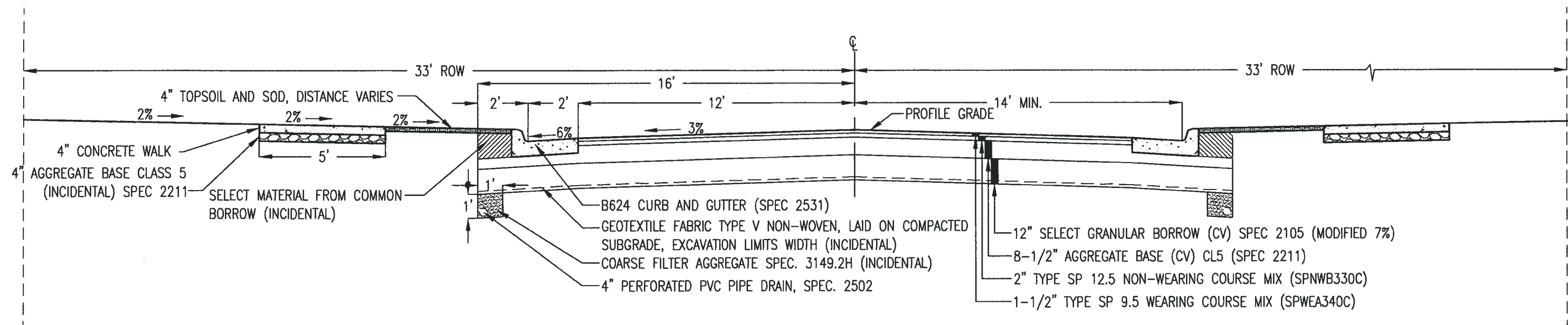


Street to be extended more than 300 feet.



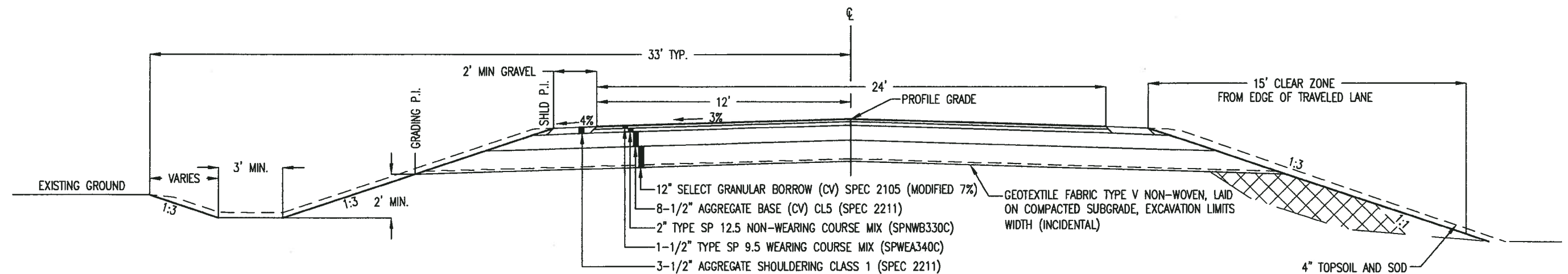
## **APPENDIX D**

### **Example: Typical Sections**



**TYPICAL SECTION  
URBAN STREET WITH SIDEWALKS**

TYPICAL URBAN STREET SECTION		SIGNATURE: _____ DATE: _____	REVISION # & DESCRIPTION	DRAWN BY: ???
CITY OF DULUTH	CERTIFIED BY: ??		REVISION # & DESCRIPTION	SHEET TITLE
CITY PROJECT NO.: ??	REG. NO.: ??		REVISION # & DESCRIPTION	SHEET NO. ?? OF ??



**TYPICAL SECTION FOR RECONSTRUCTION ONLY  
RURAL STREET**

**NOTES**

1. ALL DITCH BOTTOMS, TOE OF FILL SLOPES, AND TOP OF BACK SLOPES SHALL BE ROUNDED.
2. CONSTRUCT TYPICAL SECTION TO END OF RADII ON ROAD APPROACHES.
3. CONSTRUCT BROKEN BACK SLOPE WHEN ELEVATION AT PIVOT POINT TO NATURAL GROUND LEVEL AT TOE OF SLOPE EXCEEDS 3'.
4. ALL UTILITY POLES AND UNYIELDING OBJECTS SHALL BE REMOVED AND RELOCATED OUTSIDE THE CLEAR ZONE.
5. STANDARD DITCH BOTTOM IS 3'. SEE SWPPP SHEET AND THE CROSS SECTIONS FOR EXCEPTIONS.
6. TACK, SPEC 2357, SHALL BE APPLIED BETWEEN ALL LAYERS OF BITUMINOUS PAVEMENT.
7. SLOPE DRESSING MATERIAL IS TO BE PLACED ON ALL SLOPES. MATERIAL IS TO BE SALVAGED FROM PAY ITEM 2106.607 EXCAVATION - COMMON. SLOPE DRESSING MATERIAL PLACEMENT IS INCLUDED IN PAY ITEM 2106.607 COMMON EMBANKMENT (CV).
8. PAY ITEM 2106.607 COMMON EMBANKMENT (CV). MATERIAL USED SHALL BE SELECT GRADING MATERIAL FROM PAY ITEM 2106.607 EXCAVATION - COMMON, OR HAULED IN FROM OFF PROJECT CONTRACTOR SOURCES IF AVAILABILITY IS DETERMINED TO BE INSUFFICIENT BY THE CONTRACTOR OR THE PROJECT ENGINEER.
9. PAY ITEM 2106.607 COMMON EMBANKMENT (CV).. MATERIAL USED SHALL BE REGULAR GRADING MATERIAL OR EXCESS SELECT GRADING MATERIAL FROM PAY ITEM 2106.607 EXCAVATION - COMMON.
10. ALL EXCAVATION TO BE PAID AS 2106.607 EXCAVATION - COMMON. BITUMINOUS REMOVAL QUANTITY IS NOT INCLUDED IN EXCAVATION - COMMON PAY ITEM.
11. ANY ADDITIONAL EXCAVATION (OTHER THAN SLOPE DRESSING MATERIAL), AS DEEMED NECESSARY BY THE ENGINEER WILL BE ADDED TO THE EXCAVATION - COMMON QUANTITY AND PAID FOR AT THE BID PRICE. ANY ADDITIONAL BACKFILL SHALL BE BY THE APPROPRIATE EMBANKMENT ITEM AND WILL BE PAID FOR AT THE ITEMS UNIT BID PRICE.

TYPICAL RURAL STREET SECTIONS		SIGNATURE: _____ DATE: _____	REVISION # & DESCRIPTION	DRAWN BY: ???
CITY OF DULUTH	CERTIFIED BY: ??		REVISION # & DESCRIPTION	SHEET TITLE
CITY PROJECT NO.: ??	REG. NO.: ??		REVISION # & DESCRIPTION	SHEET NO. ?? OF ??

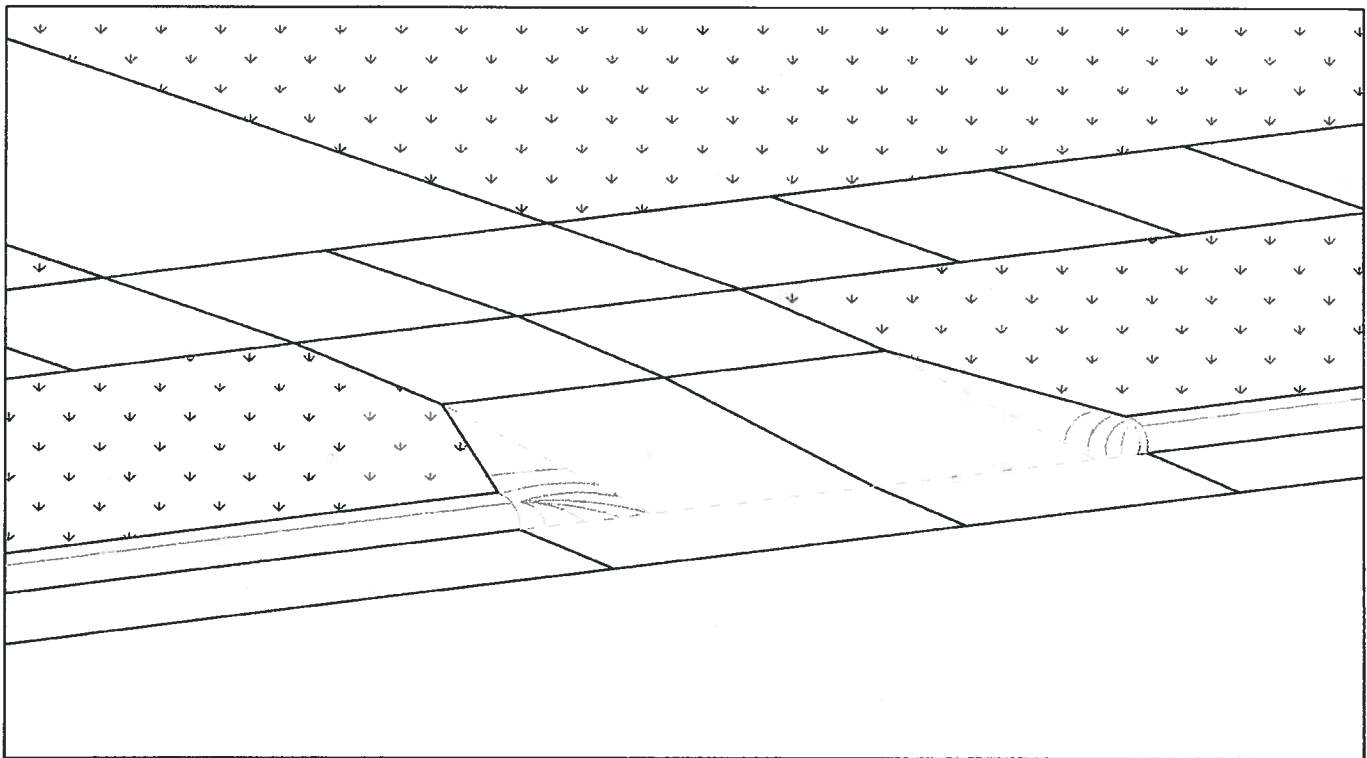
**APPENDIX E**  
**City of Duluth Driveway Entrance Requirements**



**PUBLIC WORKS & UTILITIES DEPARTMENT  
ENGINEERING DIVISION**

**411 W. 1ST ST, RM #211  
DULUTH, MN 55802  
(218) 730-5200  
(218) 730-5907 FAX**

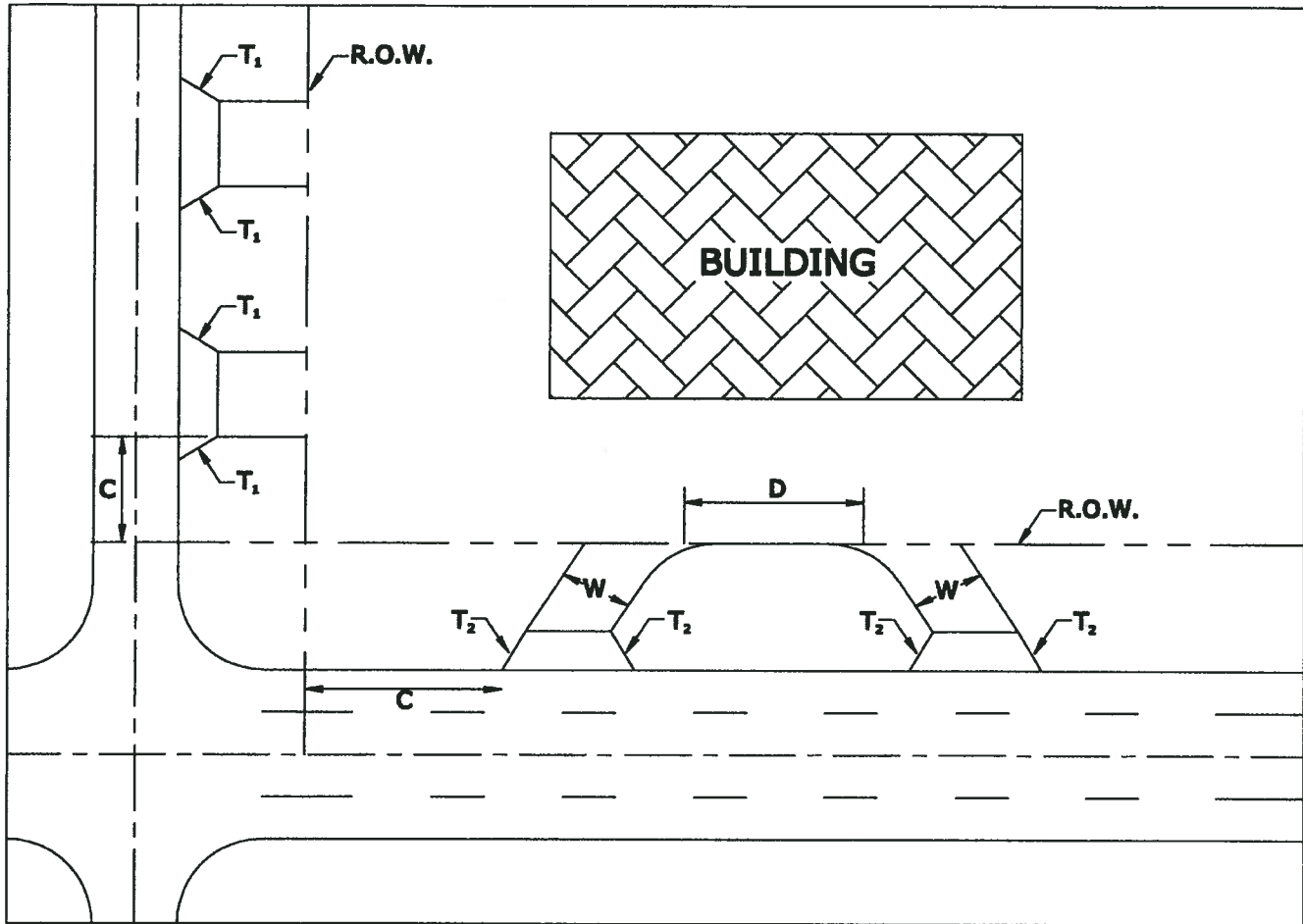
## **DRIVEWAY ENTRANCE SPECIFICATIONS AND REGULATIONS**



### **Duluth City Code:**

#### **Section 45-14 Driveway Crossings**

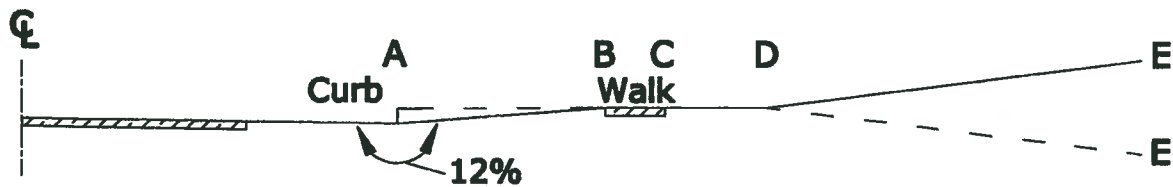
**No person shall construct a driveway or crossing from a publicly maintained street or highway into private property without first applying for and obtaining a permit to do so from the office of the City Engineer. Upon receiving this permit said driveway or crossing and such construction shall be carried out under the direction and inspection of such engineer or his representative.**



DRIVEWAY DIMENSIONS	RESIDENTIAL		COMMERCIAL - INDUSTRIAL			
	URBAN	RURAL	URBAN	URBAN	RURAL	RURAL
Driveway Angle ( $\gamma$ )	60° - 90°	60° - 90°	60°	90°	60°	90°
Minimum Driveway Width ( $W$ )	12'	12'				
Recommended Driveway Width ( $W$ )	16'	16'	26'	32'	26'	32'
Maximum Driveway Width ( $W$ )	22'	22'	*	*	*	*
Taper ( $T_1$ )	2'	2'	3'	3'	3'	3'
Taper ( $T_2$ )	2'	2'	3'	3'	3'	3'
Minimum Distance Between Double Driveway ( $D$ )	20'	30'	20'	20'	30'	30'
Minimum Corner Clearance From Major Street ( $C$ )	30'	60'	30'	30'	60'	60'
Minimum Corner Clearance From Minor Street ( $C$ )	20'	60'	20'	20'	60'	60'

\* Driveway widths up to 40 ft will be permitted only by special permission of the City Engineer. These maximum widths are intended for driveways used nearly exclusively by tractor-trailor combinations. Required width is to be determined with vehicle wheel templates.



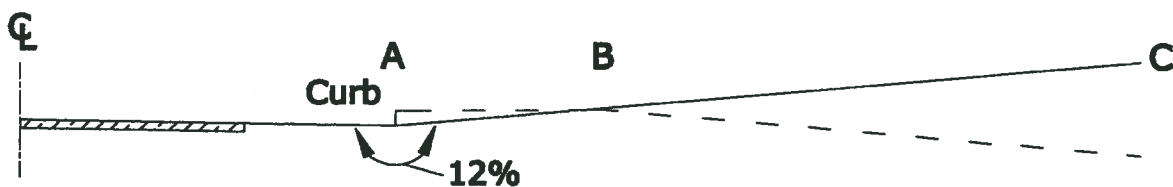


### PROFILE WITH CURB AND SIDEWALK

A to B = Slope from gutter to meet sidewalk (max. grade 10%)

C to D = Variable distance

D to E = 8% max. for commercial driveways, 10% for others.



### PROFILE WITH CURB

A to B = Slope upward to min. height equal to curb height.

(max. diff. between downward slope of roadway and the upward slope of the driveway equal 12%)

B to C = 8% for commercial driveways, 10% for others.



### PROFILE IN CUT SECTION

A to B = Same pitch as shoulder slope.

B to C = 8% max. (Min. pitch same as shoulder slope.)

C to D = 8% max. for commercial driveways, 10% for others.

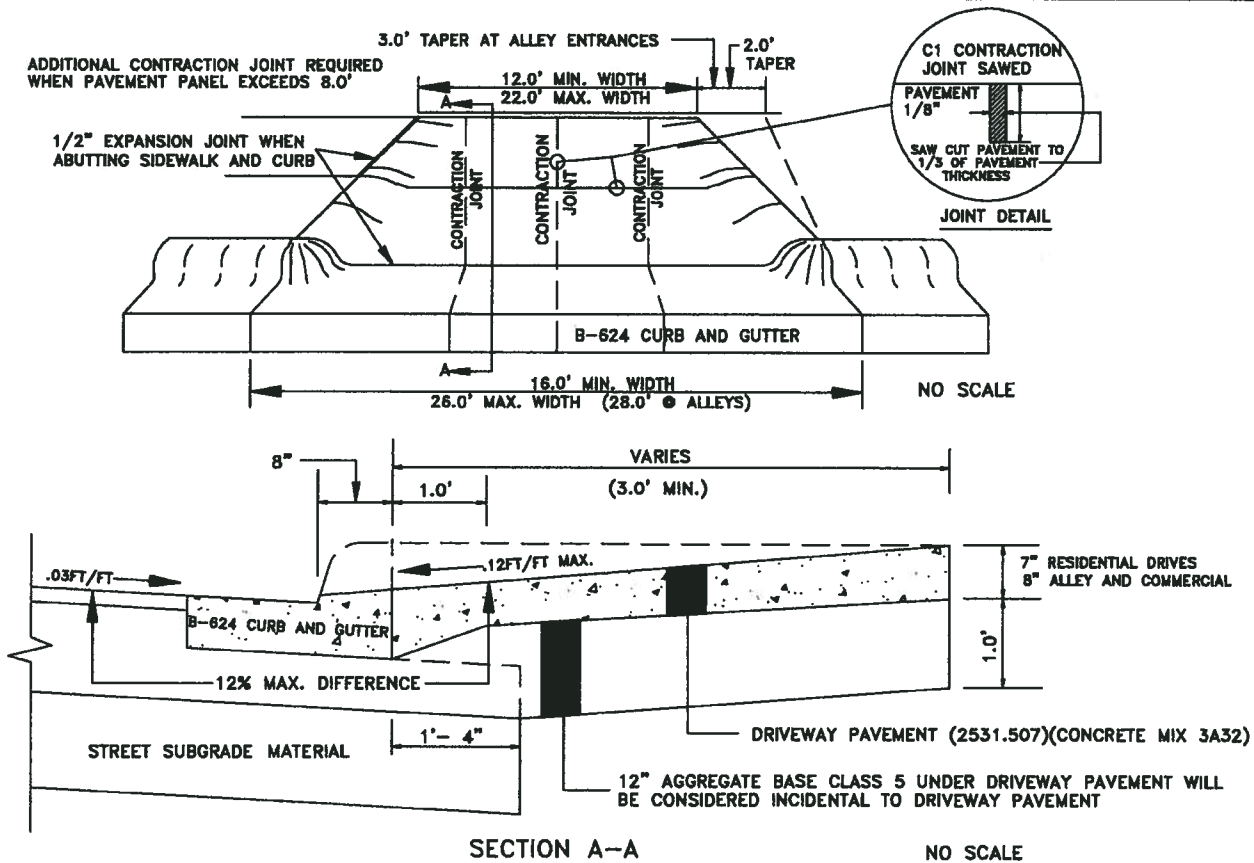


### PROFILE IN FILL SECTION

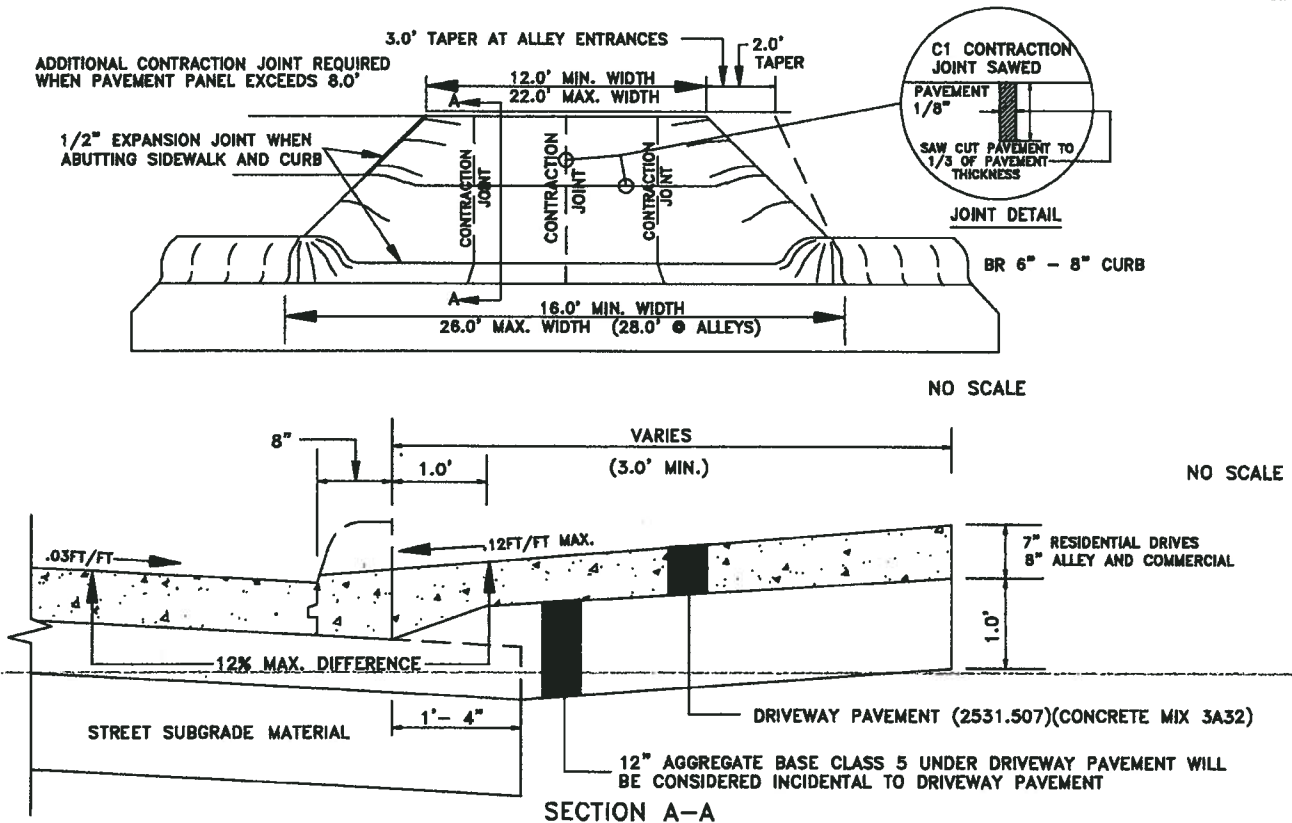
A to B = Same pitch as shoulder slope.

B to C = 8% max. for commercial driveways, 10% for others.

## DRIVEWAY DETAIL FOR CONCRETE CURB AND GUTTER STREET



## DRIVEWAY DETAIL FOR CONCRETE STREET WITH INTEGRANT CURB



## **SPECIAL REQUIREMENTS**

- 1. All work under this application must be performed by a contractor that is bonded and insured to work in the right of way by the City Engineering Office.**
  - 2. No work under this application is to be started until application is approved and the permit issued.**
  - 3. No changes or alterations in entrances may be made at any time without a permit from the City Engineer's office.**
  - 4. If work to be done lies on a county or state roadway, permission must also be obtained from the department having jurisdiction.**
  - 5. Where work on a traveled roadway is necessary traffic must be protected, and signage placed according to Appendix B, of the Minnesota Manual on Uniform Traffic Control Devices.**
  - 6. If drains are installed they must be sufficient size in order that overflow and damage to property will not occur.**
  - 7. No foreign material such as dirt, gravel, or bituminous material shall be left or deposited on the road during the construction of driveway or installation of drainage facilities and roadside must be cleaned up after work is completed.**
  - 8. No work shall be done which will create a nuisance.**
  - 9. No lugs shall be used on equipment traversing roadway which will damage the road surface.**
  - 10. No driving onto roadway from ditch or driving on shoulders where damage will occur.**
  - 11. After driveway is formed the permittee shall notify the City Engineer's Office for inspection at least four hours before scheduled concrete pour.**
  - 12. After driveway construction is completed the permittee shall notify the City Engineer's Office that the work has been completed and is ready for final inspection.**
- 
- 13. If pavement is damaged or if settlement occurs or if excavation caves in so that replaced materials settle (bituminous mat or concrete base) the same shall be restored to its original condition.**

# CURB CUTS - DRIVEWAY APRONS

1/1/04

The driveway *itself* requires no permit.

## PERMIT REQUIRED FOR:

- 1) Any NEW driveway apron: (a) with or without a curb  
(b) with or without a culvert
- 2) WIDENING an EXISTING apron WITH A CONCRETE or BITUMINOUS CURB or a CULVERT.
- 3) REDO an EXISTING driveway apron--replacing the existing materials. It doesn't matter if the present apron is gravel, blacktop, or concrete as long as it's EXISTING.

## NO Permit Required for:

- 1) Re-blacktop an existing blacktop driveway and/or apron: (a) with or without a curb  
(b) with or without a culvert
- 2) On a blacktop or gravel street, blacktop an existing gravel apron

## NOTE:

**\*\* If the work involves the sidewalk (the sidewalk will be removed and replaced), a permit will be required in all cases. \*\***

## General Information

It **IS NOT** permissible to place blacktop in the gutter to relieve the bump at the driveway entrance.

- A concrete street requires a concrete **driveway** apron.
- Blacktop streets with a concrete curb and gutter require a concrete apron.
- Blacktop streets without a curb/gutter or with a blacktop curb/gutter will use a blacktop or concrete apron.
- Gravel streets may use a gravel or blacktop apron.

Driveway aprons can be constructed over sewer/gas/water mains.

The driveway itself or the *flare* of the apron, can be placed right on the property line. However, putting a driveway that close to a property line means working on a neighbor's property just to construct the driveway or apron. Also, simply getting into or out of a car might also need to be done on a neighbor's property--that property owner may object.

With street improvement projects, the contractor may replace an existing apron or construct a new concrete driveway apron (if a gravel or blacktop apron is in place). Usually, there will be no charge to the property owner; however, on occasion, an assessment may be levied along with the assessment for the street improvement.

- With no sidewalk, the contractor must construct the driveway apron to a minimum of three feet behind the curb.
- With a sidewalk, the contractor must construct the driveway apron to the public sidewalk (as the sidewalk is considered the nearest public improvement from the street).

**EXCEPTION:** *IF* the boulevard is ten feet or more in depth, concrete is not necessary all the way to the sidewalk. Concrete is only required for the first three feet of the apron; blacktop may be used to complete the apron to the sidewalk.

## TO OBTAIN A PERMIT FOR A CURB CUT (driveway apron)

- 1) Complete an application for a curb cut.  
Send/give specifications sheets as well.  
Be certain applicant sketches a drawing of his/her proposed construction.
- 2) For streets/avenues not requiring a culvert, a front counter technician may approve the application.
- 3) If a culvert is necessary or possibly necessary, follow Culvert Installation Policy instructions.
- 4) An insured and bonded contractor must be engaged to install the actual driveway apron (as the work is being done in the right-of-way).
- 5) Miscellaneous permit issued for \$35.00 to the contractor.

**APPENDIX F**  
**Policy on the Issuance of Driveway Permits for Private**  
**Improvements in Right-of-Way**

# **Policy on the Issuance of Driveway Permits for Private Improvements in Right-of-Way**

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## **Policy on the Issuance of Driveway Permits for Private Improvements in Right-of-Way**

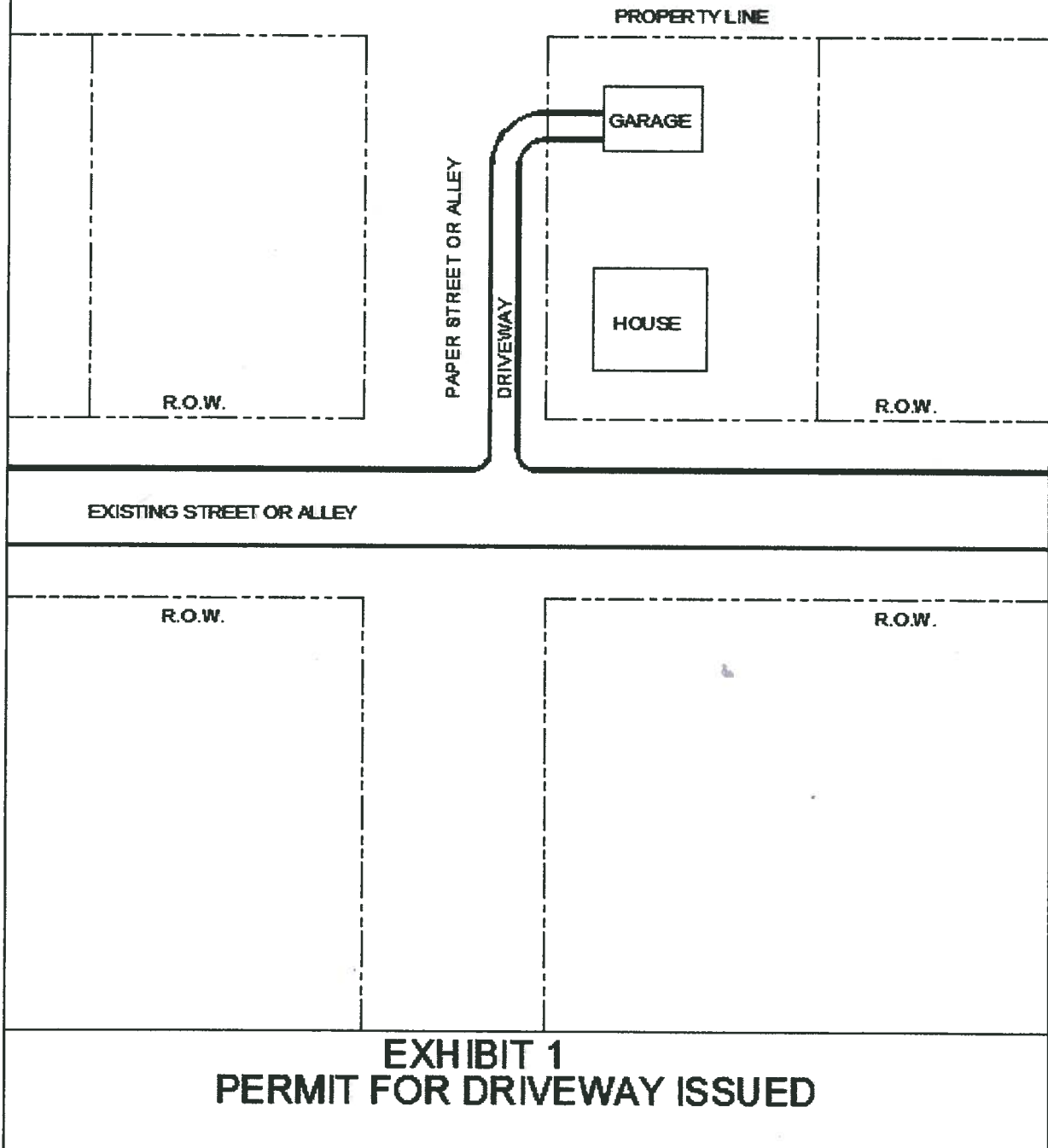
### **Background**

Prior to the August 15, 2008 Minnesota Supreme Court case *Bolen v Glass*, the issuance of driveway permits on unimproved "paper" right-of-way was done only if easements from all abutting parties were obtained. This was considered a private property matter. Based on the ruling in the case, it was decided that the City was the trustee of the right-of-way and had the authority to determine when and how the right-of-way is improved. The City has the authority to issue a permit for private improvements within the dedicated right-of-way. It was also determined that the owners of property within a plat have the right to use the right-of-way for access purposes, subject to the issuance of a permit by the city.

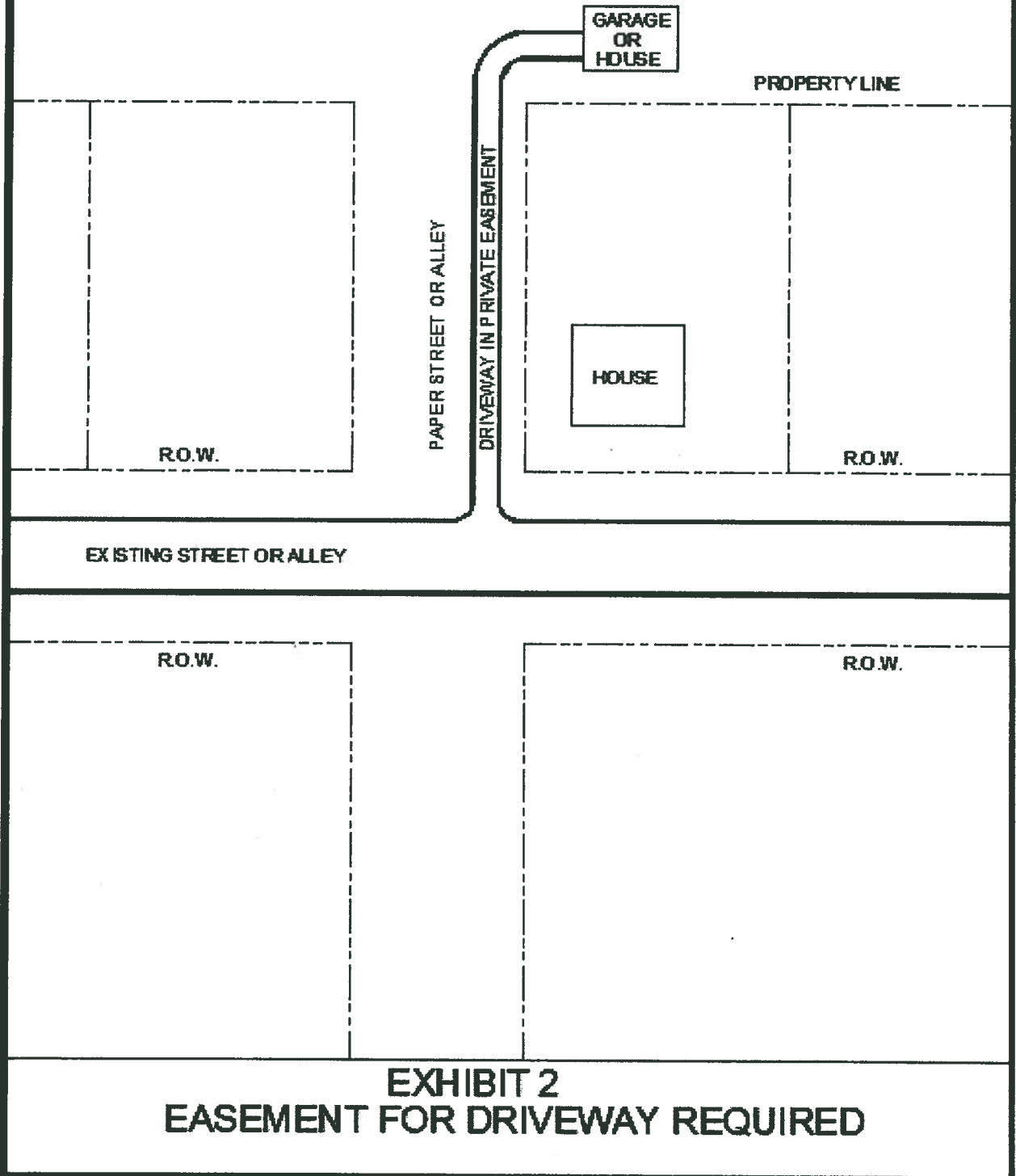
### **Criteria for Issuing Driveway Permits within Right-Of-Way**

1. If the property is a corner lot with improved frontage and the driveway request is on the unimproved "paper" street, a permit may be issued to the owner to construct a private driveway in the unexercised easement between their property and the property adjacent to the easement. See attached Exhibit 1.
2. Driveways requiring additional length beyond the property line of the corner lot shall either be built as public street or alley to City of Duluth "Local Design Standards" or for driveways not constructed to the "Local Design Standards", the permittee shall be required to obtain private driveway easements from the abutting property owners. In both cases, the city would issue a permit, the permittee would provide the proper bonds and insurance for work within the right-of-way and agree to be responsible for any maintenance and snow removal. See attached Exhibit 2.
3. Any permits issued shall be subject to the following conditions:
  - a) Private driveways shall not be allowed when the street serves other residential developable lots within the plat that may use this driveway for access to their property in the future.
  - b) Private driveway permits will be allowed in residentially zoned areas only--not commercial.
  - c) Private driveways will not be allowed to serve properties that can be further subdivided.
  - d) Prior to issuing the driveway permit, the property owner must sign an "Agreement to Petition for (future) Street Improvement" which needs to be recorded by the city. This helps ensure that in the future, the resident has waived their right to protest the permanent street or alley assessment.
  - e) The property owner will be responsible for maintaining and plowing the private driveway.
  - f) The property owner or contractor will need to have the appropriate bonds and insurance on file for work within the right-of-way.

PRIVATE DRIVEWAY ALLOWED  
WITH PROPER PERMIT FROM ENGINEERING.

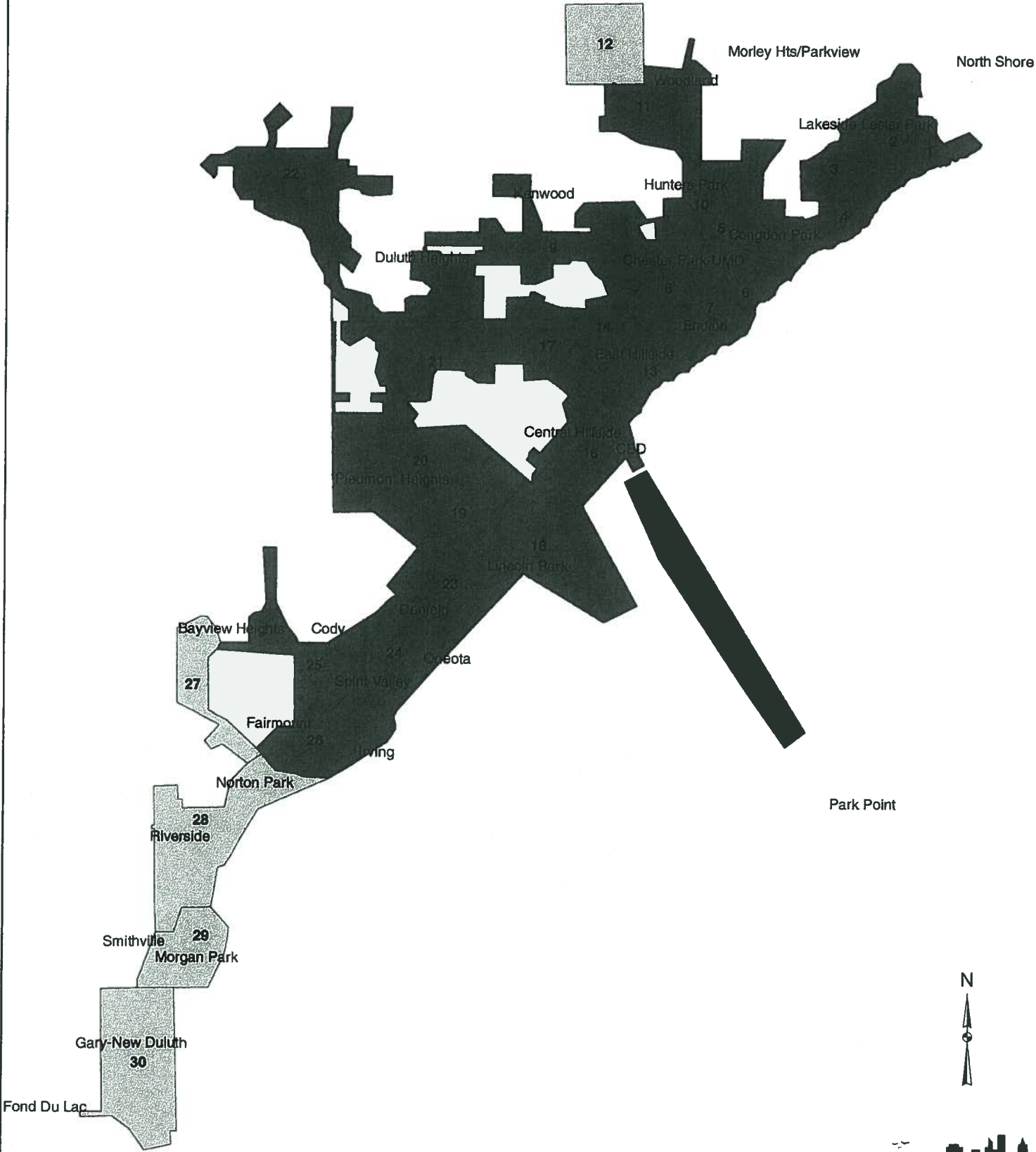


PRIVATE DRIVEWAY NOT ALLOWED W/O EASEMENT  
FROM ABUTTING PROPERTY OWNERS.



**APPENDIX G**  
**Sanitary Sewer Basins – General Map**

Consent Decree Basins ; January 2010  
1 through 11 and 13 through 26



## **APPENDIX H**

### **Sanitary Sewer Wye Record**

**DULUTH SANITARY SEWER WYE RECORD****All blue boxes must be filled in - addresses must be provided if available**

Engineering project number	DATE	INSPECTOR
PROJECT DESCRIPTION		
General Description (example: Sanitary sewer located in 4th street alley)		
Address		
Parcel ID (if address not available)	Lot	Block
Addition		

Distance to Downstream Manhole

feet

Manhole number

Distance to Upstream Manhole

feet

Manhole number

Locating Wire

Wye Material

Wye Size

Side of line

(right or left when looking downstream)

Main Size

Main Material

Add remarks if connected to existing brick arch

Remarks:

**APPENDIX I**  
**Stormwater Portion of the Unified Development Code**

**50-18: Overlay Districts69F**

**50-18.1: Natural Resources Overlay (NR-O)70F (Formerly Ch. 51 Water Resource Management)**

**E. Storm Water Management and Erosion Control<sup>86</sup>**

**1. Goals and Purpose<sup>87</sup>**

- (a) The federal Clean Water Act (CWA) requires that municipal storm water discharges be authorized under the National Pollution Discharge Elimination System (NPDES). The city is allowed to discharge its storm water under coverage provided by a CWA Municipal Separate Storm Sewer System General Permit (MS4 Permit). As part of the requirements of the permit, the city is required to develop a Storm Water Pollution Prevention Program (MS4 Program) with specific goals requiring:
  - (i) Non-degradation of all city waters;
  - (ii) Restrictions to special designated waters in the city, including:
    - (a) Lake Superior (which is an MPCA designated Outstanding Value Resource Water with both restricted discharge and impaired water designations); (b) St. Louis River (which is an MPCA designated impaired water and area of concern; and (c) 16 trout streams designated by the DNR.
- (b) The goals described in the city's MS4 Program pertaining to illicit discharge detection and elimination, construction-site runoff controls, and post-construction runoff treatment are incorporated into this Chapter by reference.
- (c) The purpose of this Section 50-18.1.E is to establish regulations to comply with the federal CWA and the city's MS4 Permit and to achieve the goals stated in the city's MS4 Program.<sup>88</sup>

**2. Temporary Erosion and Sediment Controls<sup>89</sup>**

**(a) Applicability**

This Section 50-18.1.E.3 applies to all land disturbing activities within the city, except those specifically exempt in this section and those subject to a superseding or preemptive state or federal law. This section shall be deemed to supplement, but not to conflict with, the applicable provisions of the State Building Code.

<sup>86</sup> This Section is a heavily modified and reorganized version of the city's current Chapter 18. The city's planning and engineering departments are currently in the process of working with the state to design and implement an updated city-wide storm water plan to meet more stringent state storm water requirements. Non-compliance and penalty provisions previously included in the posted version of the NR-O have been consolidated with other violation and penalty provisions in Article 5. This subsection E will likely require additional revisions as the city formalizes its approach to meet the new state requirements. Since the revised draft of the NR-O district was posted, several abbreviations and cross-references have been changed, as well as other changes as noted. Former subsection 4 on Erosion and Sediment Control (from current Title 18), former subsection (5) on Storm Water Pollution Prevention Plan, and former subsection 6 on Drainage Report Requirements have been deleted.

<sup>87</sup> New statements.

<sup>88</sup> Since the revised draft of the NR-O district was posted, the following language was deleted. "The controls required are referred to as Best Management Practices (BMPs) to be consistent with current federal and state definition and meaning."

<sup>89</sup> New standards.

**50-18: Overlay Districts69F**

**50-18.1: Natural Resources Overlay (NR-O)70F (Formerly Ch. 51 Water Resource Management)**

**(b) Requirements**

All proposed development and redevelopment and all subdivision plats and re-plats shall include drainage system and temporary erosion and sediment Best Management Practices (BMPs) in compliance with the city's MS4 Program and the requirements shown in Table 50-18.1.E-1 below. Plans, engineering analysis and calculations, diagrams, drainage reports and other data shall be submitted, as required by the city engineer or designee with each development proposal or application for permit.

Table 50-18.1.E-1: Temporary Erosion and Sediment Controls				
Land Area Disturbed ►	≤ 3,000 sq. ft. <sup>[1]</sup>	> 3,000 and ≤ 10,000 sq. ft. <sup>[2]</sup>	> 10,000 sq. ft. and < 1 acre	≥ 1 acre
Development Plan Measures Required ▼				
Temporary erosion and sediment controls to prevent any off-site migration of sediment	✓			
Site specific Erosion and Sediment Control Plan (ESCP) and ESCP Permit from city engineer		✓	✓	
Site specific Storm Water Pollution Prevention Plan (SWPPP) meeting MPCA NPDES Permit requirements for Construction Activity				✓
MPCA NPDES/State Disposal System Construction Storm Water Permit				✓
MS4 Statement of Compliance from city engineer			✓	✓
[1] If the city engineer determines that the proposed development is in a vulnerable area and may cause the degradation of the waters connected to the city's storm water system, then the provisions applicable to land disturbance areas between 3,000 and 10,000 sq. ft. shall apply.				
[2] If land disturbed is within a mapped shorelands zone, an MS4 Statement of Compliance from the city engineer is also required. <sup>90</sup>				

**(c) Authority to Waive<sup>91</sup>**

The city engineer has authority to waive the requirements in Table 50-18.1.E.1 in accordance with the city's MS4 Permit. If storm water and erosion controls required by this subsection 2 are demonstrated to be technically feasible, provisions of subsection 2 must be met to the maximum extent practicable.

<sup>90</sup> The 3,000 sq. ft. threshold for this requirement is proposed in the April 20, 2009 Draft of the proposed "MN Shoreland Rules..." anticipated to be implemented in 2010.

<sup>91</sup> New clause since the revised draft of the NR-O overlay was posted.

**50-18: Overlay Districts<sup>69F</sup>**

**50-18.1: Natural Resources Overlay (NR-O)<sup>70F</sup> (Formerly Ch. 51 Water Resource Management)**

**3. Permanent Water Quality and Discharge Rate Controls<sup>92</sup>**

**(a) Applicability**

- (i) This Section 50-18.1.E.3 applies to all land disturbing activities within the city, except those specifically exempt in this section and those subject to a superseding or preemptive state or federal law. This section shall be deemed to supplement, but not to conflict with provisions of the State Building Code.
- (ii) This section does not apply to pavement resurfacing and pavement rehabilitation projects where: no new impervious surface is created, there is no change to the configuration of the site, and there is no change to the land use.

**(b) General Requirements**

All proposed development and redevelopment and all subdivision plats and re-plats shall include drainage system and storm water runoff rate controls and water quality treatment in compliance with the city's MS4 Program and the requirements shown in Table 50-18.1.E-2 below. Plans, engineering analysis and calculations, diagrams, drainage reports and other data shall be submitted, as required by the city engineer with each project (referred to as the "development plan" below).

Table 50-18.1.E-2: Permanent Water Quality and Discharge Rate Controls <sup>93</sup> [See additional requirements for land in shorelands below]			
Development Plan Measures required ▼	Total New Impervious Area Created or the Impervious Area Redeveloped <sup>[1][2]</sup>		
	≤ 3,000 sq. ft.	> 3,000 sq. ft. and < 1 acre <sup>[3]</sup>	≥ 1 acre <sup>[4]</sup>
Water quality treatment	NONE	✓	✓
Runoff rate controls		✓	✓
Drainage report		✓	✓
Site specific SWPPP			✓
MS4 Statement of Compliance from city engineer		✓	✓
<p>[1] The total area is the sum of both the new and redeveloped impervious areas that are part of the common plan of development or sale.</p> <p>[2] A pavement resurfacing or pavement rehabilitation project is exempt where: (a) no new impervious surface is created; and (b) no change to configuration of the site occurs; and (c) no change to land-use occurs.</p> <p>[3] An individual one-family or two-family residence (that is not part of a common plan of development) with less than 10,000 sq. ft. of disturbed area and less than 7,500 sq. ft. of new impervious area is exempt.</p> <p>[4] If the site contains an existing impervious surface area greater than 1 acre, the drainage report must include an evaluation of the feasibility of 50% total suspended solids removal on an annual basis</p>			

<sup>92</sup> New standards. Significant changes since the revised draft of NR-O was posted. Former subsection (g) on Design Rainfall has been deleted.

<sup>93</sup> Since the revised draft of the NR-O was posted, the phrase "outside of shoreland areas shown on the NR-O map" has been deleted from the table heading, and the table has been significantly revised.

**50-18: Overlay Districts<sup>69F</sup>**

**50-18.1: Natural Resources Overlay (NR-O)<sup>70F</sup> (Formerly Ch. 51 Water Resource Management)**

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across the entire site.

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**(c) Authority to Waive<sup>94</sup>**

The city engineer has authority to waive the requirements in Table 50-18.1.E-2 in accordance with the city's MS4 Permit. If storm water and erosion controls required by this subsection 3 are demonstrated to be technically feasible, provisions of subsection 3 must be met to the maximum extent practicable.

**(d) Shoreland Requirements**

- (i) In addition to the requirements in subsection (b) above, no residential development or redevelopment within a shoreland shall result in impervious surface area exceeding 25% of the lot area unless the owner (a) submits a development plan including water quality treatment and (b) obtains an MS4 Statement of Compliance by the city engineer.
- (ii) In addition to the requirements in subsection (b) above, no commercial, mixed use, institutional or industrial development or redevelopment within a shoreland shown on the NR-O Map shall create new impervious surface area unless the owner (a) submits a development plan including water quality treatment and (b) obtains an MS4 Statement of Compliance issued by the city engineer.

**(e) Water Quality Treatment Requirements<sup>95</sup>**

Where subsection (b) requires that a development plan include water quality treatment, the development or redevelopment must be designed to provide the following treatment, volume reduction and pollutant removal:

**(i) Treatment Requirements<sup>96</sup>**

The development or redevelopment must provide at least the minimum treatment shown in Table 50-18.1.E.3.

**Table 50-18.1.E-3: Treatment Requirements**

Development Type	New and Existing Impervious surface	Required Treatment
New	< 1 acre	The first 1-in. Water Quality Volume (WQV) of rainfall or 80% Total Suspended Solids (TSS) removal <sup>[1]</sup>
New	> 1 acre	The first 1-in. WQV of rainfall <sup>[1]</sup>
Redevelopment	< 1 acre	10% reduction in impervious surface or 50% TSS removal
Redevelopment	> 1 acre	50% TSS removal

<sup>94</sup> New clause since the revised draft of the NR-O overlay was posted.

<sup>95</sup> New standards. This Section has been significantly revised since the revised draft of the NR-O overlay was posted, and the included table is new.

<sup>96</sup> New Section since the revised draft of the NR-O overlay was posted.

**50-18: Overlay Districts<sup>69F</sup>**

**50-18.1: Natural Resources Overlay (NR-O)<sup>70F</sup> (Formerly Ch. 51 Water Resource Management)**

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[1] Refer to additional requirements under Section 3(e)(iii) Pollutant Removal

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**(ii) Storm Water Flow Volume Reduction<sup>97</sup>**

Storm water flow volume reduction shall be provided to the maximum extent practicable. Refer to the Minnesota Storm Water Manual. Volume reduction techniques may include:

- (1) Infiltration into the ground;
- (2) Evaporation or transpiration;
- (3) Storage for re-use;
- (4) Enhanced infiltration swales, filter strips, or disconnected impervious area;
- (5) Other demonstrable methods that reduce volume.

**(iii) Pollutant Removal<sup>98</sup>**

Projects able to provide volume reduction for the first one-half in. of rainfall from newly created impervious surface shall have met city pollution abatement requirements and are exempt from this paragraph. Projects that do not meet the requirements of subsection (ii) above are required to complete computer modeling to show that water quality treatment shall provide 85% total suspended solids (TSS) removal, and the applicant shall also be required to describe and provide additional BMPs for temperature control.

**(f) Runoff Rate Control<sup>99</sup>**

Where subsection (b) requires that a development plan include runoff rate control, the development or redevelopment must be designed to provide the controls as follows. Runoff rate control is beneficial in the upper, flatter part of the watershed above the bluff line. Below the bluff line, the topography is relatively steep and storm water flows quickly to Lake Superior and the St. Louis River. This bluff line designation is shown on the NR-O Map. The storm water rate control requirements for development and redevelopment are shown in Table 50-18.1.E-4:

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<sup>97</sup> New standards. Since the revised draft of NR-O was posted, the following language was deleted: "For those areas of a project where there is no feasible way to meet the treatment requirements, other treatment such as: grassed swales, grit chambers, is required prior to runoff leaving the project site or entering surface waters."

<sup>98</sup> New standards. Significantly changed since revised NR-O draft was posted.

<sup>99</sup> New standards.

**50-18: Overlay Districts69F**

**50-18.1: Natural Resources Overlay (NR-O)70F (Formerly Ch. 51 Water Resource Management)**

Table 50.18.1.E-4: Discharge Rate Limits		
Location ►	Post-Development Peak Flow Rates at Each Discharge Point Shall Not Exceed	
Type of Activity ▼	Zone A -- Above Bluff Line	Zone B -- Below Bluff Line
<b>New Development</b>	75% of predevelopment peak flow rates for 10 and 100 year events; and 90% of predevelopment peak flow rate for 2 year event	Predevelopment peak flow rates for all storm events
<b>Redevelopment</b>	Predevelopment peak flow rates for all storm events	Predevelopment peak flow rates for all storm events

**(g) General Design Criteria<sup>100</sup>**

- (i) New minor system drainage systems shall be designed to efficiently convey the peak discharge rates for a 10-year flow.
- (ii) New major system drainage systems shall be designed to efficiently convey the peak discharge rates for a 100-year flow
- (iii) The 100-year rainfall event or 100-year peak flow shall be evaluated to ensure that no damage occurs to adjacent properties for all systems.
- (iv) The storm water management systems for any new or redevelopment project shall maintain at least three ft. of freeboard between the anticipated 100-year high water elevation and the minimum building opening.
- (v) Consideration may be given for treating existing untreated impervious areas diverted to the site and included in the control area for analysis if it is in the best interest of the city.
- (vi) All impervious areas shall be considered connected and curve numbers shall not be weighted for impervious areas except under special circumstances.
- (vii) 95% of all newly added impervious surface shall be directed to the water quality treatment area. If it is impractical to direct 95% of the added impervious surface to water quality area, alternate methods may be used in combination so long as 95% is treated and all peak flow requirements are fulfilled.
- (viii) Flow shall not be diverted from one major or minor system to another major or minor system.
- (ix) When storm water management plans involve directing runoff from a site, it shall be the responsibility of the applicant to obtain from adjacent property owners any necessary easements or other property interests concerning flowage of water to a point where the storm water enters a major system.

<sup>100</sup> New standards.

**50-18: Overlay Districts<sup>69F</sup>**

**50-18.1: Natural Resources Overlay (NR-O)<sup>70F</sup> (Formerly Ch. 51 Water Resource Management)**

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- (x) Adequate measures shall be taken to prevent uncontrolled drainage across lot lines.

**4. General Storm Water Restrictions**

- (a) Applying fertilizer, pesticides or any chemicals on impervious surfaces, within any part of storm water drainage system or any drainage way, within 25 ft. of any wetland edge or Ordinary High Water level or bank edge of any drainage course, or within any water resource buffer area is prohibited.
- (b) Sweeping, raking, blowing or otherwise placing yard waste, unless the yard waste is securely contained, in the street, ditch, gutter, storm inlet, catch basin or any part of any drainage way or other area that would allow yard waste to enter the storm drainage system is prohibited.
- (c) Yard waste segregated for pickup must be securely contained until removed.
- (d) Topsoil and erodible soil stockpiles shall be distributed within three days or covered to prevent erosion of the stockpile.

**5. Ownership and Maintenance**

**(a) Maintenance of Temporary Erosion and Sediment Control Practices<sup>101</sup>**

During the period of a land disturbing activity, the person engaging in the construction shall be responsible for installing and maintaining erosion and sediment control practices. After construction is completed, the owner of the property shall be responsible for installing and maintaining erosion and sediment control practices.

**(b) Ownership**

- (i) All components of the storm water management system shall be constructed, owned, operated and maintained by the developer or owner(s) to their confluence with the major system or city owned minor system.
- (ii) In the case of developments in which right-of-way is transferred to public ownership, the storm drain system within the city right-of-way shall be owned and maintained by the city. Storm water treatment facilities and ponds shall be in common space and shall be owned and maintained by the developer or the owners of the development. Storm water treatment facilities shall not be located in the public right-of-way.

**(c) Owner Inspection and Maintenance**

- (i) Storm water management facilities shall be designed to minimize maintenance and provide maintenance access. All facilities shall have a plan of operation and maintenance that assures continued effective removal of runoff pollutants and accumulated sediment. The developer or the owner(s) shall be

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<sup>101</sup> This material is carried over from current 18.5.

responsible for inspection, maintenance and reporting for all non-publicly owned storm water management facilities associated with the development. Copies of the inspection records shall be maintained by the developer or owner for a period of six years. Copies of all inspection records shall be provided to the city upon request.

- (ii) For the purposes of inspection during construction monitoring, the permittee shall:
  - (1) Submit an inspection log to the city on the first day of each month during the entire duration of construction;
- (iii) For the purposes of ongoing monitoring and maintenance after construction is complete, the owner shall conduct inspections on all non-publicly owned structural components and all non-structural components (including swales and pond areas) of the storm water management system;
  - (1) Submit a written report approved by an engineer summarizing findings and maintenance needs;
  - (2) Submit a written report of work completed to maintain storm water facilities. Work must be completed within three months of annual inspection.

**APPENDIX J**  
**Preliminary Design Submittal Worksheet**

## PRELIMINARY DESIGN SUBMITTAL WORKSHEET

### City of Duluth – Residential / Commercial Development Design Checklist

The City of Duluth has numerous special waters that are afforded increased pollution prevention protection under the Clean Water Act and State Statute and each project is subject to NonDegradation of all waters procedures.

#### A Preliminary Design meeting is required for all sites.

Project Name: \_\_\_\_\_

Project Location: \_\_\_\_\_

Stormwater Preliminary Site Plan & Worksheet Completed by:

Engineering Firm: \_\_\_\_\_

Engineer: \_\_\_\_\_

Design Professional License Number: \_\_\_\_\_

#### Project Narrative:

Brief Scope but with a clear description of pre- and post-development conditions:

#### A Preliminary Site Plan (PSP) is required:

- The PSP does not have to be CADD developed as long as it is clearly drawn showing a minimum of:
- Minimum 11 x 17 size -
- Overall concept(s) of Development
- All catchment areas roughly delineated
- All downstream receiving waters shown
- All downstream properties shown all the way to the major receiving water
- All existing utilities and roads shown
- NR-O overlay (floodplain type, shoreland class and stormwater rate control zone)
- All wetlands both delineated and potential areas shown

Preliminary Design Submittal Worksheet is required to show how applicant intends to consider Conservation/Low Impact Design Methods to the Maximum Extent Feasible (MEP)

**APPENDIX K**  
**Infiltration/Filtration System Evaluation Worksheet**

**Infiltration / Filtration System Evaluation Worksheet**  
**City of Duluth, MN**  
(page 1 of 3)

Owner / Developer Name: \_\_\_\_\_

Project Name / Location: \_\_\_\_\_

Engineer and Firm Name: \_\_\_\_\_

**Step 1: Determine the site areas for your project.**

- a. Total site area in acres. \_\_\_\_\_ acres
- b. Existing impervious area in acres. \_\_\_\_\_ acres
- c. New impervious area in acres. \_\_\_\_\_ acres
- d. Redeveloped impervious area in acres \_\_\_\_\_ acres
- e. Existing impervious to remain in acres \_\_\_\_\_ acres
- f. Total impervious area in acres. (1c + 1d + 1e) \_\_\_\_\_ acres

**Step 2: Determine the proposed percent impervious area for the site.**

Site percent impervious =  $100 \times (1.f. \div 1.a.) = 100 \times ( \text{_____} \div \text{_____} ) = \text{_____} \%$

**Step 3. Calculate the site runoff volume required for infiltration/filtration.**

See the Unified Development Code (UDC) Table 50-18.1.E-3 Treatment Requirements for minimum treatment requirements. New impervious surfaces require the first 1-in. Water Quality Volume (WQV) to be treated or 80% TSS removal.

a.) Volume Required =  $3,630 \times (1c) = 3,630 \times ( \text{_____} ) = \text{_____} \text{ cu.-ft.}$

Redevelopment projects require 50% TSS removal for redeveloped impervious surfaces, therefore use the first 0.5-in WQV.

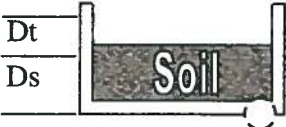
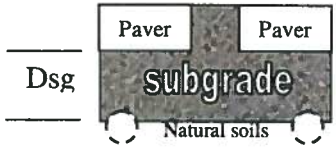
b.) Volume Required =  $1,815 \times (1d) = 1,815 \times ( \text{_____} ) = \text{_____} \text{ cu.-ft.}$

c.) Total Volume Required =  $(3a) + (3b) = ( \text{_____} ) + ( \text{_____} ) = \text{_____} \text{ cu.-ft.}$   
(step 3c value)

**Step 4. Determine the runoff volume captured by filtration BMPs (used where infiltration is prohibited or not possible due to geological conditions – soil type, shallow rock,...)**

For each of the non-infiltration practices you will use, if any, enter the type and quantity/ID of each practice in the chart provided below. Select the volume calculation method from Table 1 that best fits the practice(s) or attach a separate sheet with calculations, calculate the volume-per-practice and a total volume for non-infiltration practices.

Table 1. Example Calculations for Volume Captured by Non-Infiltration BMPs.

BMP Type	Volume Calculation (cubic-feet)	Notes
Green roofs – roof gardens  Rainwater Gardens or Bioretention areas <u>with an under drain</u>	$V = L \times W \times [(Ds \times Pe) + Dt]$ 	L = length of soil area (ft.) W = width of soil area (ft.) Ds = depth of soil (ft.) Dt = depth of storage between soil surface and overflow of practice (ft.) Pe = effective porosity of the soil = 0.4 (for this estimate). Typical range, most soils = 0.3 - 0.5
Porous Paver Systems – <u>with an under drain</u>  (may be accounted for here or in Step 6 – but NOT both.)	$V = L \times W \times (Dsg \times Pe)$ 	L = length of paved area (ft.) W = width of paved area (ft.) Dsg = depth of subgrade (ft.) Pe = effective porosity of the subgrade = 0.32

List the type (by name and ID) of each practice to be used in the following chart. Calculate the total volume captured for the Step 4 result. Add additional sheets if more than 3 types of practices to be used.

BMP Name / ID	Quantity	Vol.-per-practice (cubic-feet)	Total Practice Vol. = Quantity x vol.-per-practice (cubic-feet)
Volume Captured (add volumes in far-right column) =			

(Step 4. value)

**Step 5. Select or Identify Soil Infiltration Rate. If not using infiltration, skip to Step 7.**

For the detailed design stage, use the infiltration rate determined from site-specific soils investigation and lab testing. For planning purposes, the designer may select the infiltration rate from Table 2 that best reflects the soil type present at the site. If multiple soil-types are present, use the most restrictive soil hydrologic group when selecting an infiltration rate or complete Steps 5 and 6 for each of the different infiltration rate areas.

Table 2. Soil Infiltration Rates.

(Source: Infiltration rates taken from MPCA 2005 Minnesota Stormwater Manual, Version 1, Table 8.5.)

Hydrologic Soil Group	Infiltration Rate (in/hr)	Soil Textures
A	1.63	Gravel, sandy gravel, silty gravel
	0.80	Sand, loamy sand, or sandy loam
B	0.60	Silt loam
	0.30	Loam
C	0.20	Sandy clay loam
D	< 0.20	Clay loam, silty clay loam, sandy clay, silty clay, or clay

**\*\*Circle the soil hydrologic group(s) and infiltration rates to be used in Table 2.\*\***

Infiltration Rate = \_\_\_\_\_ in/hr  
(step 5 value)

**Step 6. Identify infiltration practices and determine the total infiltration surface area.**

For each of the practices you will use, enter the type and quantity of each in the chart provided below and calculate the surface area per-practice and a total horizontal surface area subject to prolonged wetting for infiltration practices.

BMP Name / ID	Quantity	Area-per-practice (square-feet)	Total Practice Area = Quantity x area-per-practice (square-feet)
Infiltration LID Surface Area (add areas in far-right column) =			

(\*This is the Effective Pervious Area for practices to be used for infiltration. This number should only include areas available to accept runoff from impervious surfaces. Areas such as parking lot green islands located above the elevation of the parking surface should not be included here. This number should also not include the wetted area of permanent ponds.)

**Step 6b. Calculate the volume infiltrated by practices over 48-hours.**

Volume Infiltrated = Step 6 x Step 5 x 48 hrs x 1/12 ft/in = Step 5 x Step 6 x 4 hrs-ft/in =  
= \_\_\_\_\_ sq-ft. x \_\_\_\_\_ in/hr. x 4 hrs-ft/in = \_\_\_\_\_ cu.-ft  
(step 6b value)

**Step 7. Compare the excess runoff volume to the volume infiltrated by LID practices.**

Verify that the total volume filtered in Step 4 and infiltrated in Step 6b is greater than the excess runoff volume calculated in Step 3. If the total of Steps 4 and 6b is greater than the amount from Step 4, sufficient practices have been planned to meet the City standards. The designer should refer to the City's design standards in Appendix C of the Water Resources Management Plan for more information of design requirements for infiltration practices. If the result for Step 3 is greater than the total from Steps 4 and 6b, additional filtration and/or infiltration practices are needed.

Step 4 + Step 6b MUST BE GREATER THAN OR EQUAL TO Step 3c

\_\_\_\_\_ MUST BE GREATER THAN OR EQUAL TO \_\_\_\_\_

**APPENDIX L**  
**Example: Standard SWPPP Plan Sheets**

NPDES STORM WATER POLLUTION PREVENTION PLAN (SWPPP)

SIP EXAMPLE. DEVELOPMENT SWPPP REQUIREMENTS MAY DIFFER

- THE PROJECT WILL RECONSTRUCT EXISTING CITY STREETS AND ASSOCIATED INFRASTRUCTURE INCLUDING GRADING AND EXCAVATION; TRENCHING FOR NEW AND RECONSTRUCTED UTILITIES; NEW CURB AND GUTTER; NEW BITUMINOUS AND CONCRETE PAVEMENT; AND TURF ESTABLISHMENT.
- THE TOTAL LAND AREA ANTICIPATED TO BE DISTURBED BY THE PROJECT (EXCLUSIVE OF BORROW AND DISPOSAL AREAS) IS ?? ACRES.
- CONSTRUCTION DATES ARE ESTIMATED TO BE FROM ?? TO ??.
- THE RECEIVING WATER FOR STORM WATER FROM THE PROJECT INCLUDES EXISTING STORM SEWER SYSTEMS LEADING TO LAKE SUPERIOR.
- CITY OF DULUTH MAINTENANCE IS RESPONSIBLE FOR LONG TERM OPERATION AND MAINTENANCE OF THE STORMWATER SYSTEM.
- CONTACTS:

OWNER & RECORDS RETENTION: (FOR SIP)  
CITY OF DULUTH  
ENGINEERING DEPARTMENT  
211 CITY HALL  
DULUTH, MN 55802  
(218) 730-5200

THE CITY OF DULUTH PROJECT ENGINEER IS: (FOR SIP)  
PROJECT ENGINEER  
211 CITY HALL  
DULUTH, MN 55802  
(218) 730-5091  
engineer@duluthmn.gov

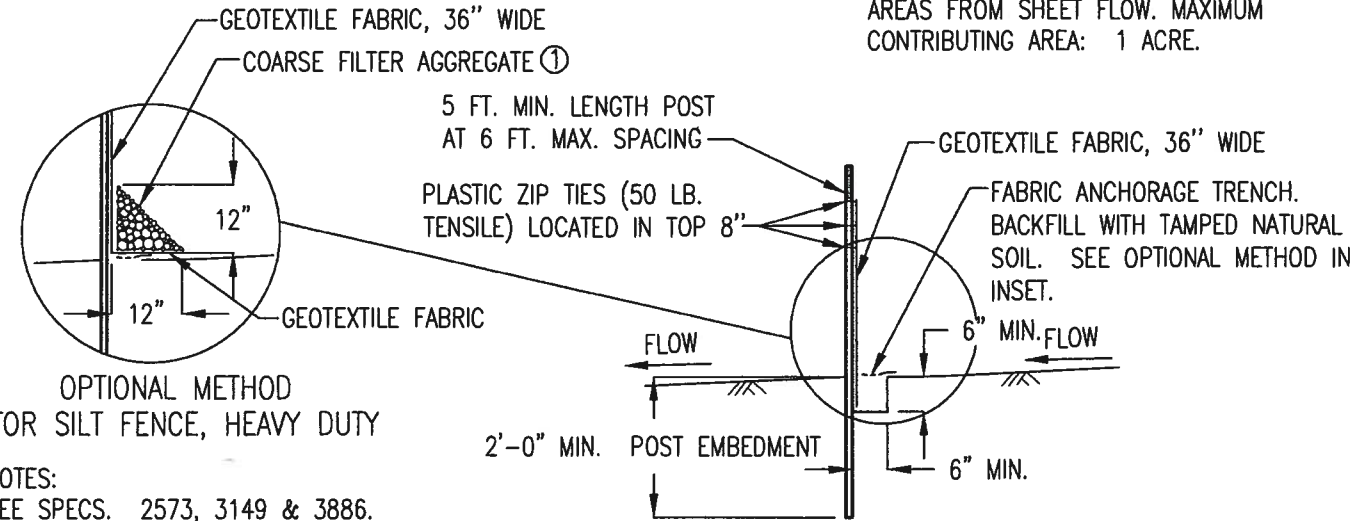
TIMING OF BMP INSTALLATION

- THE EROSION AND SEDIMENTATION CONTROL BMPs SHALL BE INSTALLED AS NECESSARY TO MINIMIZE EROSION FROM DISTURBED SURFACES AND CAPTURE SEDIMENT ON SITE, AND SHALL MEET THE NPDES PERMIT PART IV CONSTRUCTION ACTIVITY REQUIREMENTS.
- TEMPORARY PERIMETER CONTROL BMPs WILL BE INSTALLED BEFORE ANY UP GRADIENT SOIL DISTURBANCE OCCURS.
  - PERMANENT AND TEMPORARY SEDIMENT TRAPS AND BASINS (IF APPLICABLE) WILL BE CONSTRUCTED BEFORE ANY CONVEYANCE OR DEWATERING OCCURS.
  - TOPSOIL AND TEMPORARY EROSION CONTROL BMPs SHALL BE PLACED WITHIN 3 DAYS OF COMPLETION OF EMBANKMENT
  - PLACEMENT OF RIPRAP SHALL BE COMPLETED WITHIN 24 HOURS OF CULVERT PLACEMENTS AND DONE IN ONE CONTINUOUS OPERATION.
  - ONCE CONSTRUCTION ACTIVITY CEASES FOR 3 DAYS OR MORE IN AN AREA, THAT AREA WILL BE STABILIZED WITH TEMPORY OR PERMANENT BMPs FOR EROSION.

CALCULATIONS

TOTAL DISTURBED AREA = X.X ACRES  
POST CONSTRUCTION IMPERVIOUS AREA = X.X ACRES  
EXISTING IMPERVIOUS AREA = X.X ACRES  
IMPERVIOUS NET = X.X ACRES (INCREASE/DECREASE)  
SOILS INFORMATION: XX

WEBSOILSURVEY.NRCS.USDA.GOV



- NOTES:  
SEE SPECS. 2573, 3149 & 3886.  
① COARSE FILTER AGGREGATE (SPEC. 3149)  
SHALL BE INCIDENTAL.

CONSTRUCTION NOTES

- CONSTRUCTION SHALL BE GOVERNED BY THE MNDOT STANDARD SPECIFICATIONS (2005), CITY OF DULUTH STANDARD CONSTRUCTION SPECIFICATIONS AND SPECIAL PROVISIONS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF THE SWPPP AND THE INSTALLATION, INSPECTION AND MAINTENANCE OF THE EROSION AND SEDIMENT CONTROL BMPs BEFORE AND DURING CONSTRUCTION.
- THE CONTRACTOR SHALL KEEP WRITTEN INSPECTION AND MAINTENANCE LOGS (INCLUDING ALL CLEAN OUT AND CORRECTIVE ACTIONS) IN ACCORDANCE WITH THIS SWPPP AND ALL PERMITS.

TMDL IMPLEMENTATION PLANS CONTAINING STORM WATER REQUIREMENTS

NO TMDL IMPLEMENTATION PLANS CURRENTLY EXIST FOR THE RECEIVING WATERS ON THIS PROJECT.  
THE ST. LOUIS RIVER IS LOCATED XX.X MILES FROM THE PROJECT AND IS AN MPCA LISTED IMPAIRED WATER.

LOCATION OF SWPPP REQUIREMENTS IN PROJECT PLAN		
DESCRIPTION	TITLE	LOCATION
SUMMARY OF PVIOUS & IMPERVIOUS	SWPPP	SHEET XX
DIRECTION OF FLOW/DRAINAGE AREA	PLAN	SHEETS XX-XX
RECEIVING SURFACE WATERS	PLAN	SHEETS XX-XX
NO DISTURBANCE AREAS & AREAS OF CONSTRUCTION	SWPPP	SHEETS XX-XX
DRAINAGE STRUCTURES	PLAN & PROFILE	SHEETS XX-XX
DRAINAGE TABULATIONS	DRAINAGE CHART	SHEETS XX-XX
EROSION CONTROL TABULATIONS	TABULATIONS	SHEETS XX-XX
EROSION CONTROL SHEETS	PLAN	SHEETS XX-XX
EROSION CONTROL DETAILS	DETAILS	SHEETS XX-XX
SEDIMENT CONTROL PRACTICES	SWPPP	SHEETS XX-XX
FINAL STABILIZATION	TABULATION	1033;1033;SHEETS XX-XX
SEDIMENT BASIN (POND) TABULATIONS	N/A	N/A
POND SHEETS (SEDIMENT BASINS	N/A	1033;1033;N/A
LOCATION OF PONDS	N/A	N/A

SWPPP IMPLEMENTATION CONTACTS			
AGENCY	PERMIT	NAME	PHONE/E-MAIL
CONTRACTOR'S EROSION CONTROL SUPERVISOR		TO BE DETERMINED	TBD
MPCA	NPDES	JIM DEXTER	(218)529-6253 james.dexter@pcs.state.mn.us
SWCD	WCA	NATE SCHROEDER	(218)723-4867 nathan.schroeder@southstlouisswcd.org
MNDNR WATERS AREA HYDROLOGIST	N/A	PATRICIA FOWLER	(218)834-6621 patricia.fowler@dnr.state.mn.us
CORPS OF ENGINEERS	SECTION 404	DARYL WIERZBINSKI	218-834-6630 daryl.w.wierzbinski@mvp02.usa.ce.army.mil
STATE DUTY OFFICER	N/A	MPCA	800-422-0798
CITY REVIEW	N/A	GARY MINCK	(218)-730-5074 gminck@duluthmn.gov
LGU-CITY OF DULUTH	N/A	KYLE DEMING	(218)730-5580 kdeming@duluthmn.gov
CITY OF DULUTH SOLID WASTE OFFICER	N/A	SARAH BENNING	(218)730-5151 sbenning@duluthmn.gov

CERTIFIED BY: PROJECT ENGINEER  
PRINTED NAME

SIGNATURE

REG. NO. XXXXX

DATE

PROJECT NAME

SWPPP

CITY PROJECT NO. XXXTR

SHEET NO. OF SHEETS

EROSION CONTROL NOTES

- 1. MNDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION (2005 EDITION) SHALL APPLY. ALONG WITH THE (A.) CITY OF DULUTH OR (B.) DEVELOPER, THE CONTRACTOR WILL BE CO-PERMITTEE FOR THE MPCA NPDES STORM WATER CONSTRUCTION PERMIT FOR THIS PROJECT - CONTRACTORS SIGNATURE ON PERMIT IS REQUIRED.
  - 1.1. SUBMIT INITIAL EROSION CONTROL (EC) SCHEDULE AT OR BEFORE THE PRECONSTRUCTION CONFERENCE.
  - 1.2. SUBMIT EC SCHEDULE ALTERATIONS/ADJUSTMENTS WEEKLY THEREAFTER FOR ENGINEER'S APPROVAL.
- 2. THE CONTRACTOR IS RESPONSIBLE FOR EROSION CONTROL QUALITY CONTROL (WC) ON THIS PROJECT. CONTRACTOR SHALL PHASE/SEQUENCE THE PROJECT TO MINIMIZE EXPOSURE TO EROSION. CONTRACTOR SHALL PLACE OR OTHERWISE CONSTRUCT EROSION CONTROL AND SEDIMENT CONTAINMENT DEVICES TO MINIMIZE THE RUNOFF, TRACKING, AND SEDIMENT LOSS FROM DISTURBED AREAS OF THE PROJECT SITE.
- 3. DISTURBED SLOPES NOT ACTIVELY WORKED SHALL BE PROTECTED FROM SOIL EROSION WITH TEMPORARY OR PERMANENT COVER WITHIN 3 DAYS OF BEING WORKED. EROSION CONTROL BLANKET AND SOIL STAPLES SHALL BE USED.
- 4. AT MINIMUM, THE FOLLOWING CONTROLS WILL BE IMPLEMENTED AT THE CONSTRUCTION SITE:
  - 4.1. EROSION CONTROL BLANKETS SHALL BE USED ON ALL SLOPES 1:3 OR STEEPER
  - 4.2. SILT FENCES SHALL BE USED IN CONJUNCTION WITH OTHER EROSION BMPS
  - 4.3. ROCK DITCH CHECKS OR APPROVED EQUAL ARE TO BE USED TO REDUCE DITCH VELOCITIES AND REDUCE EROSION
  - 4.4. STORM INLET AND OUTLET AREAS SHALL BE CONTINUOUSLY PROTECTED WITH MNDOT APPROVED DEVICES/METHODS
  - 4.5. STABILIZED CONSTRUCTION ENTRANCE, OR REUSABLE MUD MAT SHALL BE USED TO REDUCE SEDIMENT TRACKING
  - 4.6. PERMANENT VEGETATION WILL BE ESTABLISHED RIGHT AFTER TOPSOIL IS SPREAD
  - 4.7. CONTROL ALL SITE SOLID WASTE, DEBRIS, MATERIAL STORAGE AND CONCRETE WASHOUT ON SITE. NO MIGRATION OFFSITE OR INTO DITCHES/STORM SYSTEMS PERMITTED
- 5. ALL SLOPES AND DITCHES SHALL BE STABILIZED PRIOR TO OPENING NEW CULVERTS INTO EXISTING DRAINAGE WAYS.
- 6. IF ANY STOCKPILE IS TO REMAIN IN PLACE FOR MORE THAN 3 DAYS SEDIMENT AND EROSION CONTROL DEVICES SHALL BE USED.
- 7. WATER PUMPED OR OTHERWISE DISCHARGED FROM THE SITE DURING CONSTRUCTION DEWATERING SHALL BE DIRECTED THROUGH EFFECTIVE FILTERING DEVICE(S) IN ACCORDANCE WITH MNDOT SPECIFICATION 2573. USE OF APPROVED FLOCCULANT MAY BE NECESSARY.
- 8. THE CONTRACTOR SHALL TAKE ALL POSSIBLE PRECAUTIONS TO PREVENT APPRECIABLE SOIL TRACKING ONTO ROADWAYS. APPRECIABLE SOIL, MUD, OR DEBRIS WASHED, TRACKED, OR DEPOSITED ONTO PAVED SURFACES SHALL BE REMOVED PRIOR TO THE END OF EACH WORK DAY.
- 9. STABILIZED CONSTRUCTION ENTRANCE(S) SHALL BE REMOVED AND AREA RESTORED AFTER GRADING IS COMPLETE.
- 10. THE CONTRACTOR QC PROGRAM SHALL ENSURE THAT A COMPETENT INDIVIDUAL SHALL INSPECT EROSION AND SEDIMENT CONTROL DEVICES WEEKLY AND AFTER EACH RAIN EVENT. ALL NONFUNCTIONAL DEVICES SHALL BE REPAIRED/REPLACED/CLEANED. MAINTAIN WRITTEN LOG OF ALL WEEKLY AND RAIN EVENT INSPECTIONS - INCLUDE THE CORRECTIVE ACTIONS THAT WERE TAKEN.
- 11. THE CONTRACTOR SHALL MAINTAIN THE CAPABILITY TO IMPLEMENT RAPID STABILIZATION METHOD 4 (MNDOT 2573.4) AT ALL TIMES. INCLUDES CAT III EROSION CONTROL BLANKET (ECB) [N. AMERICAN GREEN S150 OR APPROVED EQUAL] ALONG WITH SEED MIXTURE, FERTILIZER, AND SOIL STAPLES PER 2573-3. THE UPGRADE END OF EACH BLANKET STRIP SHALL BE BURIED AT LEAST 6 INCHES IN A VERTICAL CHECK SLOT. STAPLES SHALL BE PLACED AT SEAMS AND THROUGHOUT THE BLANKET AT A MAXIMUM SPACING IN ALL DIRECTIONS OF 2 FEET. PAYMENT ALLOWED SHALL BE PER CONTRACT OR IN ABSENCE OF CONTRACT BID PRICE IN ACCORDANCE WITH MNDOT SPECIFICATION 2575.5

CONSTRUCTION PRACTICES TO MINIMIZE STORM WATER CONTAMINATION  
TO PREVENT STORM WATER CONTAMINATION FROM OCCURRING, THE FOLLOWING BMPS WILL BE IMPLEMENTED:

- 1. ALL AREAS THAT ARE ROUGH GRADED MUST BE KEPT IN A SMOOTH CONDITION TO ALLOW SHEET FLOW OF STORM WATER WHEREVER PRACTICAL AND ALWAYS READY FOR SURFACE APPLICATION OF DEGRADABLE OR NON-DEGRADABLE BLANKETS, MULCH, OR OTHER PROTECTIVE COVERS.
- 2. A STABILIZED CONSTRUCTION ENTRANCE/EXIT WILL BE CONSTRUCTED TO REDUCE VEHICLE TRACKING OF SEDIMENTS OFF THE PROJECT RIGHT OF WAY.
- 3. ALL SOLID WASTE MATERIALS WILL BE COLLECTED AND STORED IN A SECURELY LIDDED METAL DUMPSTER OR OTHER APPROVED CONTAINMENT METHOD AT THE END OF EACH DAY. ANY ALTERNATIVE TO A METAL DUMPSTER MUST BE SUBMITTED IN WRITING FOR APPROVAL BY THE PROJECT ENGINEER. ALL TRASH AND CONSTRUCTION DEBRIS FROM THE SITE WILL BE DEPOSITED IN THE DUMPSTER. THE DUMPSTER WILL BE EMPTIED AS NECESSARY TO FUNCTION AS INTENDED FOR DEBRIS COLLECTION. NO CONSTRUCTION MATERIALS WILL BE BURIED ON-SITE. THE CONTRACTOR'S EROSION CONTROL SUPERVISOR WILL INSTRUCT ALL PERSONNEL REGARDING THE CORRECT PROCEDURE FOR DISPOSAL.
- 4. RECYCLABLE MATERIALS MUST BE SEPARATED ON-SITE AND SEGREGATED IN DESIGNATED CONTAINERS.
- 5. A LICENSED SANITARY WASTE MANAGEMENT CONTRACTOR WILL COLLECT ALL SANITARY WASTE FROM THE PORTABLE UNITS AT A RATE NECESSARY TO MAINTAIN DESIGNED FUNCTION.
- 6. ALL VEHICLES ON SITE WILL BE MONITORED FOR LEAKS AND RECEIVE REGULAR PREVENTIVE MAINTENANCE TO REDUCE THE CHANCE OF LEAKAGE.
- 7. FERTILIZERS WILL BE STORED IN A COVERED SHED AND PARTIALLY USED BAGS WILL BE TRANSFERRED TO A SEALABLE BIN TO REDUCE THE CHANCE OF SPILLAGE.
- 8. PETROLEUM PRODUCTS WILL BE STORED IN TIGHTLY SEALED CONTAINERS, WHICH ARE CLEARLY LABELED.
- 9. SPILL KITS WILL BE INCLUDED WITH ALL FUELING SOURCES AND MAINTENANCE ACTIVITIES. SECONDARY CONTAINMENT MEASURES WILL BE INSTALLED AND MAINTAINED BY THE CONTRACTOR.
- 10. ANY ASPHALT SUBSTANCES USED ON SITE WILL BE APPLIED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.
- 11. ALL PAINT CONTAINERS AND CURING COMPOUNDS WILL BE TIGHTLY SEALED AND STORED WHEN NOT REQUIRED FOR USE. EXCESS PAINT WILL NOT BE DISCHARGED TO THE STORM WATER SYSTEM BUT WILL BE PROPERLY DISPOSED OF ACCORDING TO MANUFACTURER'S INSTRUCTION.
- 12. MATERIALS AND EQUIPMENT NECESSARY FOR SPILL CLEAN-UP SHALL BE READILY AVAILABLE AND BE KEPT IN AN ENCLOSED TRAILER OR SHED ON SITE. EQUIPMENT WILL INCLUDE, BUT NOT LIMITED TO, BROOMS, MOPS, DUST PANS, RAGS, GLOVES, GOGGLES, ABSORBENT (KITTY LITTER, OIL ABSORBENT BOOMS AND DIAPERS) AND BUCKETS.
- 13. ALL SPILLS WILL BE CONTAINED AND CLEANED UP IMMEDIATELY UPON DISCOVERY. SPILLS LARGE ENOUGH TO REACH THE STORM WATER CONVEYANCE SYSTEM WILL BE REPORTED TO THE MINNESOTA DUTY OFFICER AT 1-800-422-0798.
- 14. CONCRETE TRUCKS WILL NOT BE ALLOWED TO WASH OUT OR DISCHARGE SURPLUS CONCRETE OR DRUM WASH WATER ON THE SITE UNLESS DONE IN AN ENGINEERED CONTAINMENT SYSTEM. THE ENGINEERED SYSTEM MUST INCLUDE SITE DRAWINGS FOR THE PROJECT FILE AND WRITTEN ASSURANCE THAT THE SYSTEM WILL WORK AS DESIGNED AND LEAVE NO DISCHARGE OF CONCRETE OR CONCRETE RESIDUE POTENTIAL TO ENTER WATERS OF THE STATE.
- 15. FORM RELEASE OIL USED FOR CONCRETE WORK MUST BE APPLIED OVER A PALLET CONTAINING ABSORBENT TO COLLECT EXCESS LIQUID. THE ABSORBENT MATERIAL WILL BE REPLACED AND PROPERLY DISPOSED OF WHEN SATURATED.
- 16. DISCHARGES FROM BASIN DEWATERING OPERATIONS THAT ARE TURBID OR SEDIMENT LADEN SHALL BE DISCHARGED TO TEMPORARY SEDIMENT BASINS CONSTRUCTED ON THE SITE TO PROVIDE TREATMENT PRIOR TO DISCHARGE TO A WATER OF THE STATE.

CERTIFIED BY: PROJECT ENGINEER	REG. NO. XXXXX	DATE	PROJECT NAME	SWPPP		
			CITY PROJECT NO. XXXXTR	SHEET NO.	OF SHEETS	

**APPENDIX M**  
**Drainage Report Submittal Coversheet and Checklist**

**Drainage Report Submittal Cover Sheet and Check List**  
**City of Duluth, MN** (Attach to Drainage Report Submittal)

**Project Name:** \_\_\_\_\_

**Owner / Developer:** \_\_\_\_\_

**Engineering Firm and Engineer:** \_\_\_\_\_

**Drainage Report Date:** \_\_\_\_\_ **Est. Construction Start Date:** \_\_\_\_\_

Summary of Submittal Requirements - (Individual projects may require additional information / data to sufficiently review the complete stormwater management plan.) (See Engineering Guidelines, Section V.D.Drainage Report for detailed report requirements.)

Drainage Report Document	Included	
	Yes	No
Project Title Sheet		
Table of Contents		
Introduction-Executive Summary		
Report Body - Describing Entire Project (text and summary tables)		
Development size, phases, timelines....		
Detail all aspects of the Pre and Post construction conditions		
Summarize Pre/Post Runoff Rate/Volume for 2,10,100-yr Type II Storms		
Summarize water quality treatment (% capture / volume / efficiency)		
Low impact design efforts		
Discuss in detail the stormwater management BMPs function		
Operation and Maintenance requirements		
Special Waters requirements per MPCA		
Exhibits		
Overall Site Map of Project		
Delineation of drainage areas/watershed		
Show project within surrounding drainage context		
Show entire runoff route to downstream receiving waters		
Show adjacent property owners and property owners to receiving waters		
Show drainage arrows and proximity to Special Waters / Wetlands		
Show applicable flood plain and lowest finish floor opening's elevation		
11x17 Plans Set		
Site specific delineated drainage patterns - Pre and Post		
Construction details to protect special waters/wetlands		
Stormwater Management BMPs -Plan/Sections/Details/Specifications		
Erosion and Sediment Control Plan		
SWPPP		
Design Calculations		
Model output: Pre/Post rate & volume for site and BMPs		
(include inputs, hydrographs, flow schematics)		
Model output: Water Quality		
Preliminary Design Submittal Worksheet		
Infiltration / Filtration BMP Worksheet		
Soils / Geotechnical investigation data		
Flood Plain impacts documentation if applicable		
Other _____		
Other _____		

**APPENDIX N**  
**Example: City of Duluth – Plan Sheet – Title Page**



**APPENDIX O**  
**Water Main Check-off List**

## Water Check off list to Final Main Extension Projects

Project Location: \_\_\_\_\_

Contractor: \_\_\_\_\_

Consultant: \_\_\_\_\_

Inspector: \_\_\_\_\_

Item	Responsibility
1. Water mains passed bacteriological test  Date: _____ Inspected By: _____	City Engineering
2. Water mains passed pressure test  Date: _____ Inspected By: _____	Consultant or Engineering
3. Confirm position of water & gas valves, on or off, as required  Date: _____ Inspected By: _____	Consultant & Operations
4. Water & Gas valves checked for operation and grade  Date: _____ Inspected By: _____	Consultant & Operations
5. Water curb boxes located, checked, adjusted to grade and marked  Date: _____ Inspected By: _____	Consultant & Contractor
6. Hydrants checked if extension needed and installed, hydrant marker installed, hydrant facing proper direction, tracing wire brought to grade where applicable, vented cap installed where applicable  Date: _____ Inspected By: _____	Consultant & Contractor
7. Water main is accepted by City Engineering  Date: _____ Inspected By: _____	City Engineering

### Notes:

A – It is the designated project inspector's responsibility to insure that the check off list is complete before last payment to contractor is made.

B – Project inspector to provide City Engineering with: record plan as related to Water main construction, copies of inspector's notes relating to same, completed hydrant record forms, completed valve record forms, and completed service record forms.

C – City Engineering to provide Utility Operations with copy of completed check off list.

D – City Engineering to provide Fire Department with location of all new or moved hydrants.

**APPENDIX P**  
**Water Valve, Hydrant and Service Installation Records**

**DULUTH VALVE INSTALLATION RECORD**

**All blue boxes must be filled in, except station/offset information not required when taped measurements available.**

NUMBER		DATE		INSPECTOR	
DPW&U PROJECT NUMBER				PROJECT DESCRIPTION	

**TAPED OUT HYDRANT MEASUREMENTS (measurement from road centerline must be included)**

TIES				ST/AVE	
TIES				ST/AVE	
TIES				ST/AVE	

**STATIONING & OFFSET VALVE MEASUREMENTS**

Station and Offset Measurements should only be included where it is not practical to provide cross street measurements above

STATIONING 0+00 =		STREET NAME	
OFFSET FROM		STREET NAME	
VALVE STATION		OFFSET DISTANCE	

VALVE SIZE		MATERIAL	
VALVE USE		VALVE TYPE	
VALVE END		MANUFACTURER/MODEL	
KEY SIZE		KEY LENGTH	
		TURNS	
		RIGHT OR LEFT	
HOUSED		VALVE LEFT OPEN	

Remarks:

**DULUTH HYDRANT INSTALLATION RECORD**

**All blue boxes must be filled in, except station/offset information not required when taped measurements available.**

**A valve sheet for the hydrant valve shall also be completed**

NUMBER		DATE		INSPECTOR	
DPW&U PROJECT NUMBER		PROJECT DESCRIPTION			

**TAPED OUT HYDRANT MEASUREMENTS (measurement from road centerline must be included)**

TIES				ST/AVE	
TIES				ST/AVE	
TIES				ST/AVE	

**STATIONING & OFFSET HYDRANT MEASUREMENTS**

Station and Offset Measurements should only be included where it is not practical to provide cross street measurements above

STATIONING 0+00 =		STREET NAME	
OFFSET FROM		STREET NAME	
HYDRANT STATION		OFFSET DISTANCE	

HYDRANT CONNECTED TO		MAIN IN	
----------------------	--	---------	--

CONNECTION		VALVE TO HYDT		MAIN TO HYDT.	
------------	--	---------------	--	---------------	--

BURY DEPTH		HYDRANT OFFSET		IF YES HOW?	
------------	--	----------------	--	-------------	--

IF 2ND BEND USED	
------------------	--

HYDRANT PLUMB		COARSE AGGREGATE	
---------------	--	------------------	--

DRAIN PLUG INSTALLED		TAGGED		VENT CAP	
----------------------	--	--------	--	----------	--

ELEVATION		NOZZLE HEIGHT		HYDRANT FLUSHED	
-----------	--	---------------	--	-----------------	--

MAKE/MODEL		MODEL NO.	
------------	--	-----------	--

DULUTH NOZZLE THREADS		LEVEL WORKING AREA	
-----------------------	--	--------------------	--

Remarks:

--

FOR DPW&U DISTRIBUTION:

WAS HYDRANT RAISED?		WAS HYDRANT DRAINED AFTER OPERATING?	
---------------------	--	--------------------------------------	--

**DULUTH HYDRANT VALVE INSTALLATION RECORD**

**All blue boxes must be filled in, except station/offset information not required when taped measurements available.**

**Use this sheet for hydrant valves**

NUMBER		DATE		INSPECTOR	
DPW&U PROJECT NUMBER		PROJECT DESCRIPTION			

**TAPED OUT VALVE MEASUREMENTS (measurement from road centerline must be included)**

TIES				ST/AVE	
TIES				ST/AVE	
TIES				ST/AVE	

**STATIONING & OFFSET VALVE MEASUREMENTS**

**Station and Offset Measurements should only be included where it is not practical to provide cross street measurements above**

STATIONING 0+00 =		STREET NAME		
OFFSET FROM		STREET NAME		
VALVE STATION		OFFSET DISTANCE		

VALVE SIZE		MATERIAL		
VALVE USE		VALVE TYPE		
VALVE END		MANUFACTURER/MODEL		
KEY SIZE		KEY LENGTH		RIGHT OR LEFT
HOUSED		VALVE LEFT OPEN		

Remarks:

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<b>City of Duluth Public Works &amp; Utilities</b> <b>Water Service Installation Record for Water Main Replacement</b>			
Application No. _____		Application/order Date _____	
Install a _____ inch Water Service	Sewer In Same Trench _____		
Material _____			
Address No _____	Street/Av _____		
Lot _____	Block _____		
For/Division _____			
Excavator _____			
<b>WATER SERVICE INFORMATION</b>			
Size Main _____	Cover @ Main _____	Condition _____	
Center Of Main to Shutoff _____	Tap _____		
Cover @ Shutoff _____	Least Cover _____		
Completion Date _____	Inspector _____		
		Company _____	
Insulated? _____	Frost _____	Rock _____	
<b>WATER SERVICE MEASUREMENTS</b>			
Shutoff _____	Ft out from Bldg. _____	Ties off _____	
Shutoff _____	Ft _____	from _____	Line Bldg _____
Shutoff Located _____			
Center of street to Shutoff _____ Ft			
<b>ALTERNATE METHODS OF MEASUREMENT</b>			
2. STATIONING AND OFFSETS - Parallel station/offset to Street/Avenue may also be used for tap, shutoff and corners of building served. CL Station for closest intersecting Ave/Street must also be given			
Shutoff _____	Building Corner _____		
Tap _____	Building Corner _____		
Closest intersecting Street/Ave or Hydrant _____			
Reference line used for offsets _____			

<b>City of Duluth Public Works &amp; Utilities</b> <b>Water Service Installation Record for New Development</b>			
Application No. _____		Application/order Date _____	
Install a _____ inch Water Service	Sewer In Same Trench _____		
Material _____	_____		
Address No _____	Street/Av _____		
Lot _____	Block _____		
For/Division _____	_____		
Excavator _____	_____		
<b>WATER SERVICE INFORMATION</b>			
Size Main _____	Cover @ Main _____	Condition _____	
Center Of Main to Shutoff _____	_____	Tap _____	
Cover @ Shutoff _____	_____	Least Cover _____	
Completion Date _____	_____	Inspector _____	
		Company _____	
Insulated? _____	Frost _____	Rock _____	
<b>WATER SERVICE MEASUREMENTS</b>			
Shutoff Located _____	_____		
Center of street to Shutoff _____	_____ Ft (required)		
2. STATIONING AND OFFSETS - Parallel station/offset to Street/Avenue may also be used for tap, shutoff and corners of building served. CL Station for closest intersecting Ave/Street must also be given			
Shutoff _____	Building Corner _____	_____	
Tap _____	Building Corner _____	_____	
Closest intersecting Street/Ave or Hydrant _____		_____	
Reference line used for offsets _____		_____	